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AUTHOR	Best, Stephen H.; Myer, Donna Foster
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ABSTRACT

This instructor's resource guide, one in a series of products from a project to develop an associate degree program for paraprofessional rural family health promoters, deals with teaching a course in introductory epidemiology. Covered in the first section of the guide are the role of epidemiology in rural health promotional training, general objectives and recommendations for instructors, and references and suggested course texts. A series of unit overviews dealing with the following topics is provided: an introduction to epidemiology; disease causation; agent, host, and environmental factors; vital statistics; experimental design, sampling, and data; patterns of individual disease occurrence; time and location patterns of disease occurrence; epidemiological research; the practice of epidemiology; bacteria; viruses; fungi; protozoa; and helminths. Each unit contains general and specific objectives, a list of instructional materials, suggested activities, specific activities to complete individual objectives, and a student assignment. Concluding the guide are a discussion of methods and materials for student evaluation and a description of other materials in the Family Home Health Training Program series. (MN)

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A SERIES OF MATERIALS SUPPORTING AN ASSOCIATE DEGREE

ED237712

APPENDIX TO
A FINAL REPORT ON THE
PARAPROFESSIONAL RURALLY ORIENTED
FAMILY HOME HEALTH TRAINING PROGRAM

an instructor resource guide for
teaching a course in

INTRODUCTORY EPIDEMIOLOGY

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developed for
the U.S. Department of Education
Office of Vocational and Adult Education
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AN INSTRUCTOR RESOURCE GUIDE
FOR TEACHING A COURSE IN

INTRODUCTORY EPIDEMIOLOGY

part of a Series of Materials Developed to Support
an Associate Degree in Rural Health Promotion

developed for
THE U. S. DEPARTMENT OF EDUCATION
OFFICE OF VOCATIONAL AND ADULT EDUCATION

developed by
THE PARAPROFESSIONAL RURALLY ORIENTED FAMILY HOME HEALTH
TRAINING PROGRAM
THE DIVISION OF NATURAL SCIENCES
THE BAPTIST COLLEGE AT CHARLESTON
CHARLESTON, SOUTH CAROLINA

author
Stephen H. Best, B.S.,M.S.
Assistant Professor of Biology
The Baptist College at Charleston

with

Donna Foster Myer, B.S.,M.S.
Assistant Professor of Natural Sciences
Director of Rural Health Promotion
the Baptist College at Charleston

1983

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INTRODUCTION

RURAL HEALTH PROMOTION -
Definitions and Assumptions

The Associate Degree in Rural Health Promotion was developed out of concern for the health status of Americans in rural areas. Behind the development of such a paraprofessional degree lie certain definitions and assumptions about rural areas and the health problems they face. It is therefore appropriate to delineate some terms and concepts before describing the degree and its components in more detail. While this discussion will not attempt to comprehensively document the changing perceptions of rural issues, it summarizes the development of "mind-sets" which undergird the development of this project.

Probably the most difficult definition to make is of the term "rural". While we can easily quote dictionary definitions, there are important intrinsic and extrinsic connotations to the word "rural" which also need to be explored. The term rural carries with it tacit assumptions about population density, types of employment, character and structure of population centers, as well as the values and outlooks of the citizens. For example, RURAL is seen as:

country, not city
provincial, limited in perspective
unsophisticated
rustic
simple, leisurely paced life
religious
agricultural

William H. Friedland, in an article in The Journal of

Rural Sociology in 1982, suggests that if we base our definition of rural on the concept of this type of homogeneous culture, then we will find few rural areas left in the United States. This country has seen the development of an urban - rural continuum in terms of population densities which blurs any clear cut geographical definition, producing "fringe" areas with combination characteristics. So called "reverse" migration to lower density areas, as well as the effects of modern news and entertainment media, have resulted in "country" communities where many of the basic conditions of urban life are reproduced - culture, food, commodities, interests, etc.

These views of the changing character of rural populations are upheld by other studies in a variety of fields. Farms have become agribusinesses, with even small farms showing the impact of technological advances. Farm "managers" show the same life style illnesses of stress and overload as do urban managers. More importantly, while three out of five country residents in 1920 were engaged in farming, by 1970 this had changed to only one out of five - and is still dropping. Of the populations in rural areas, 24% of the whites and 11% of the blacks were recent arrivals - coming originally from urban areas. Yet total rural population size has changed little since 1920, while urban populations have often tripled.

Even population size definitions for "rural" vary from expert to expert. The Encyclopedia Britannica (1975 ed.) defines U.S. rural populations by default - by saying "rural" is "not urban", and "urban" means places of 2,500 or more and their fringes. A dictionary definition gives rural as "areas with less than 1,500 population". Obviously, the area's size as well as its population should be considered.

In the United States, 25% of the population lives on 90% of the land. For these "rural" areas, density varies from 200 per square mile near cities to one per ten square miles in the western mountains. In addition to density differences,the midwestern rural resident is still most likely to be involved in agriculture, the Appalachian rural populations organize their lives around the mining industries, and ,in the Carolinas, rural populations often include high percentages of textile workers.

What characteristics DO occur consistently in rural areas? While individuals and special sub-populations may defy these trends, rural populations do seem to have:

* twice the poverty rate as cities
* more under and unemployed adults
* lower educational status
* higher percentages of children, elderly, and poor

The last item on the preceding list leads us into the specific health problems of the U.S. rural resident, for all three sub-populations - children, the elderly, and the poor - have more health needs than the average citizen. However, once again the specific health needs of rural areas are somewhat inconsistent with our preconceptions. While we picture the "country life" as leading to healthy longevity, the rural populations of America have more activity limiting chronic health conditions than do urban populations. Regardless of our vision of country life as providing healthier air, diets, and activity, rural citizens suffer from more heart conditions, more arthritis, more mental illness, more high blood pressure, and more visual impairment. Infant mortality rates are higher, alcohol use and the resultant drinking and driving mortalities are severe problems. In other words, the health issues associated with life style are more predominant in the country than in our "high pressure,

polluted, unhealthy" cities.

These, and other health problems of the rural areas of our country, are made more distressing by the realities of non-urban health care. The following figures, taken from the report on Health Care in Rural America (U.S. Dept. of Agriculture Bulletin 428), show how rural areas provide for health care:

area type	medical personnel per 100,000 population
metropolitan	157
non-metro.	71
rural (near urban)	35
rural (far from urban)	37

The problem is not with acute care - hospitals are often equally accessible to the urban dweller, the suburban dweller and the rural resident (at least in terms of access time - "from my house to seeing the doctor"). It is precisely the type of life style oriented services, focusing on chronic and preventative care, which are needed by the rural resident which are not available. This is an age - old problem; as Hippocrates said, " Healing is a matter of time, but it is sometimes also a matter of opportunity."

Certainly one way of approaching these problems is to increase the numbers of traditional health professionals who serve rural areas. This has proved to be easier said than done; physicians and nurses are costly to train and costly to support, if not for the area they serve then for society as a whole. Moreover, the U.S. Surgeon General's Report on Healthy People states that major gains in the health status of Americans in general will not be made by increasing access to traditional treatment alone, but will also require enhanced emphasis on promotion of disease

preventative life styles.

In this same vein, but focused on the needs of rural areas in particular, the Health Care in Rural America report suggests that communities train residents to serve as paraprofessionals in health care provision, from EMS(Emergency Medical Technician) services, to basic first aid, and on to health promotion and health education. Eva J. Salber and her co-workers in North Carolina addressed these needs by exploring the usefulness of "health facilitators" or "lay advisors". Their project sought to "promote good health and prevent illness rather than concentrating on the cure of illness alone" by using lay members of a community who have received "training in promotive health practices, prevention of disease, in early recognition of illness together with first aid measures."

In A Sociology of Health by Andrew C. Twaddle and Richard M. Hessler, the authors state that "...of all the strategies for improving medical care for the (rural) poor, the substantial increase in new nonphysician medical manpower is possibly the most important innovation..." Even in the areas of mental health (as discussed in Mental Health of Rural America ,NIMH and The Nonprofessional Revolution in Mental Health by Francine Sobey) paraprofessionals from rural communities have been used effectively. Part of the introduction to Sobey's book comments, "Nonprofessionals are utilized not simply because professional manpower is unavailable but rather to provide new services in innovative ways."

Although most of the training for such paraprofessionals, in both the mental and physical health areas, began as informal training programs, in both cases expanded programs soon became important. Twaddel and Hessler discuss the problem of insufficient training, both

in terms of its impact on lay workers' competency and acceptance by existing professional care givers, as well as the impact on upward or outward mobility. They quote one paraprofessional as saying "I don 't have a degree, so if I left here I may have to go ... back to business machines. I don't really feel secure. If something happens you have to try and get a job. You should at least get an associates degree in college." Nevertheless, Twaddel ends the section on Community Health Workers with these thoughts, " ...the seed has been planted for changes in health manpower. If health care is to be made available to all as a right on the order of public education, then change must occur...The community health worker program has provided a model for the creation of a new occupational hierarchy."

These then are the components which shaped the development of the Associate of Natural Sciences in Rural Health Promotion:

1. the realities and myths of rural existence
2. the need for enhanced health care in rural areas based on chronic life style illnesses and on-going inadequate numbers of treatment professionals
3. the perceived and experienced strength of utilizing community paraprofessionals
4. the training insufficiencies defined by both professionals and the paraprofessionals themselves

The next sections summarize the specific philosophies and content of the Associate Degree in Health Promotion, followed by suggested uses, and then detailed course content. For other published materials on this project, please refer to the Supplementary Materials at the end of the course materials.

AN ASSOCIATE DEGREE IN
RURAL HEALTH PROMOTION

As an innovative approach to meeting the health needs of rural America, the Rural Health Promotion Associate Degree has been developed by the Baptist College at Charleston under Contract No. 300-81-0436 with the U. S. Department of Education, Office of Vocational and Adult Education. The curriculum and special courses developed under this contract do not reflect ideas that are new to health. Instead, they draw upon several maturing concepts: health promotion, paraprofessional preparation, and holistic principles. These concepts have been used to develop an integrated, state of the art, approach to personal and community health enhancement--the paraprofessional degree in health promotion.

First, the program represents the movement toward health promotion, as an equal partner with treatment, in improving the health status of Americans. The 1979 U. S. Surgeon General's Report on Healthy People explored in great detail the role health promotion and disease prevention will play in further expansion of the Nation's health care system. The American Rural Health Newsletter (April 1983), in looking at "Rural Health Care at the Crossroad", points out "the public's desire for comprehensive health and its growing interest in health promotion."

Secondly, this program reflects an increasing awareness of the usefulness of paraprofessionals in expanding the impact of health care systems. Health promotion is one of the few areas of health services which is relying more on "people power" than on sophisticated technology. Since the goals of health promotion always includes the empowerment of the individual to make decisions about his own health habits and environment, the use of paraprofessionals is particularly appropriate. Working under the guidance of treatment, health education, and public health specialists, the paraprofessional can extend the reach of existing health promotion programs in a variety of settings from medicine and psychology to industry and religion. In the introduction to The Nonprofessional Revolution in Mental Health (Sobey, 1970) Frank Riessman points out that

"Nonprofessionals are utilized not simply because professional manpower is unavailable but rather to provide new services in innovative ways... It is noteworthy that their main function has not been to relieve professional staff to tasks requiring less than professional expertise. The major finding is that nonprofessionals are being trained for new service functions and roles, in many cases roles that were not previously being played at all..."

The idea to use two year college programs to train such paraprofessionals is not new. The Mental Health of Rural America (Segal, 1973) evaluated projects which experimented with ways to meet rural mental health needs. The projects seen to have the greatest impact were two year college programs designed to prepare people to work as paraprofessionals in a wide range of community settings. The Rural Health Promotion Degree is different in the following respect. The two year program designed at the Baptist College reflects very specifically the current movement toward holistic principles of health. Rather than focusing preferentially on physical or mental health, the program provides formal educational experiences in studies relevant to the "whole" person.

The curriculum draws from a strong natural science base (33 credits) to build an understanding of both the biological and psychological aspects of human health. By including studies in religion and sociology, as well as written and spoken communication skills, it prepares the student for effective intervention in social and interpersonal settings. Then, to focus this basic knowledge on disease prevention/health promotion, the program includes specialized courses which provide understanding of health care organizations and issues, health promotion methods, fundamentals of paraprofessional care and a prevention/promotion practicum experience.

The Associate Degree in Rural Health Promotion was designed to fit comfortably into a traditional four year college's offerings or into any technical college which offers general Associate of Arts or Associate of Science degrees. At least one full year of the program is made up of courses which are commonly offered by psychology,

science, sociology, mathematics, English, and religion departments. The specialized courses related to health promotion and paraprofessional skills will often be useful to students in other disciplines who plan to work in settings which interface with health care providers. In addition, the degree's specialized content might be used to develop a minor in health promotion for baccalaureate students or to provide required courses to update existing allied health and related degrees.

The specific course content of the Associate Degree in Rural Health Promotion is listed in annotated form in the next section.

SUGGESTED ACADEMIC CONTENT

Listed below are those courses suggested as required to earn an Associate Degree in Rural Health Promotion. The courses marked with an asterisk (*) are those which were specifically designed for the Health Promotion degree and are available as part of this set of materials. Whole prerequisites are not noted here for the specialized courses, specific prerequisites are in the detailed materials overviewing each course in the series.

English Composition and Rhetoric: Courses designed to improve students ability to express themselves accurately and effective in writing. (6 credits)

*Interpersonal Communication-Techniques and Styles: This course will teach techniques of good interpersonal communication include specific skills in listening, decision making, observation, assessment, interviewing, and group process. It will explore the effect of individual attitudes and beliefs on communication as well as cultural characteristics of communication and barriers to communication. (3 credits)

General College Mathematics: A course in general math skills with an emphasis on application. (3 credits) Or a more advanced course.

General Psychology: An introduction to concepts underlying the understinding of behavior. (3 credits)

Human Growth and Development: An overview of human development psychologically for conception through senescence, with an emphasis through adolescence. (3 credits)

Psychology of Adulthood and Aging: A study of development during adulthood. (3 credits)

Principles of Sociology: A focus on the ways sociology provides understanding of group behavior and human relations. (3 credits)

Introduction to Community Services: Introducing the organization, methods, settings of community social services. (3 credits)

Survey of New Testament: The content of the new testament. (3 credits) OR

Introduction to Group Dynamics: Religious and psychological principles applied to interpersonal relationships and group functions. (3 credits)

Anatomy/Physiology: A study of human structure and function with emphasis on the body systems. (4 credits)

Microbiology: Study of micro-organisms with emphasis on normal and pathological conditions in man and environment. (4 credits)

*Epidemiology: A study of the inter-relationship among organisms, the environment, and man. The course develops an understanding of the history of disease, their signs, symptons, and prevention. It provides a working knowledge of the terms; morbidity, mortality, acute disease, and chronic disease. Basic data are presented concerning the application of demographics, community health care, and the epidemiologic study of the causal factors of disease. (3 credits)

Nutrition: Concepts of human nutrition applied to health and disease, world hunger, and personal nutrition. (3 credits)

*Concepts of Chemistry: Key principles needed in allied health and liberal arts. (4 credits)

*Health Care Organization and Issues: The purpose, functions, and administration of community health care services, public and private. A study of issues affecting health care utilization and delivery; consumerism, ethical issues, and future technology. (3 credits)

*Health Promotion Seminar: A cognitive presentation of the major areas of emphasis for health promotion - exercise, concern over what we put into our bodies (foods, alcohol, tobacco, and other drugs), and living in high stress environments--and concommitant presentation of the major techniques of personal responsibility and personal change. The course requires application of these concepts to develop experiential knowledge in behavior change. It will also develop critical consideration of emerging health promotion ideas in both professional sources and the popular media. (1 credit)

*Fundamentals of Paraprofessional Care I and II: Development and application of knowledge and paraprofessional skills in physical care, emotional support, personal hygiene, and safety/first aid. Acute and chronic conditions will be covered. Working knowledge of medical terminology and consumer oriented pharmacology. Laboratory experiences complement the lectures and include certification in Cardiopulmonary Resuscitation. (8 credits)

*Practicum in Health Promotion. Application of classroom knowledge in community based programs related to health promotion/ disease prevention. During the first two weeks of the Semester and the last week of the Semester, this calss will meet 3 hours per week on campus to structure the students' practical experiences and discuss class assignments and requirements. The remainder of the semester the course will consist of 9-12 hours/week of experience in a community based program and one class meeting per week on campus. (3 credits)

Electives (3-6 credits); Electives are suggested from sociology, especially in the area of social institutions or rural concerns, and in health and physical education, especially in the area of fitness and aerobics and recreational exercise.

USING THESE MATERIALS IN TEACHING RURAL HEALTH PROMOTION

The Rural Health Promotion project materials include the seven course modules newly designed for this associate degree (see Suggested Academic Content), a project report, preliminary evaluation reports for both concept and courses, and a series of Focus Guides for use with existing care courses. Although designed to be used as a two year associate degree curriculum in a college setting, the individual courses can be used separately as they fit other academic needs.

All of the courses in this series were developed in a regular semester format for students who meet general admissions requirements for a four year college. It may be that a paraprofessional program such as Rural Health Promotion will attract students whose high school preparation has been less academic than traditional four year students. However, we feel it is preferable to meet any such deficiencies as they arise using, existing college resources, rather than to structure the program and course content at a lower level. One specific reason for this is based in the nature of the activity for which these students are being prepared.

The health promotion paraprofessionals will need to function in their communities in a median position between the professional health care providers and lay recipients of such care. The credibility with which they function will be based in part on their ability to communicate with, and value the standards and expectations of, people on both ends of this care continuum. Interactions with the professional community may be tenuous at best in some settings. The existance of "watered down" courses in the program could contribute to a perception of the paraprofessional as "amateur." Indeed, other paraprofessional roles--such as the paramedics--have been effected by this attitude. Even nursing, now a profession in its own right, was once seen as "wasting our time educating a group of semi-professionals." (Jensen's History and Trends of Professional Nursing)

A second reason for dealing with deficiencies outside of this program is to clearly integrate the program academically into the parent institution, rather than having it exist with a separate

level of expectations. Finally, students who have clearly and directly faced their own learning deficits should be better prepared to relate to the lay end of the professional-lay continuum with understanding and compassion.

It is expected that these courses may merely be a first approximation of what is needed in some academic settings. Each course includes state-of-the-art material at the time it was written and edited, including references and suggested support materials. Yet, health promotion is a rapidly growing field where excellent new materials are developing daily. We feel the objectives, concept outlines, and supplementary materials can be used either as specific delineation of a course or as general core concerns to be fleshed out according to other professional interests and directions.

Reports on the development of the curriculum for the Associate of Natural Sciences in Rural Health Promotion and the proto-type field testing and evaluation of both concept and courses are also available as part of this series of materials. The project report components may be useful for health education designers or administrators or for service providers as they plan directions in training and community services for the last part of the Twentieth Century. Even if this degree has only limited implementation, we feel the ideas and directions addressed in the project overall and in the courses specifically can serve as stimuli for discussion and decision making in a society with changing ideas of health, health care, and responsibility for health.

Finally, the Rural Health Focus Guides were developed to direct the thoughts of teachers in core areas (such as English, mathematics, sociology, etc.) without re-writing existing courses. These materials are listed separately in the Supplementary Materials section and may be interesting for educators who are concerned or curious about the interface between their area of expertise and changing concepts of community and personal health.

SPECIFIC COURSE MATERIALS

FOR

EPIDEMIOLOGY

The Role of
EPIDEMIOLOGY
in the Rural Health Promotion Curriculum

Epidemiology is the study of the inter-relationships among organisms, the environment and man. It includes the natural history of disease as well as signs, symptoms, and issues of prevention. In the field of community health, epidemiological data identifies areas of immediate concern, tracks the effects of sociological and biological changes on the health of a population, and helps to define future tasks and directions. Health promotion is also affected by the dynamic interplay of host, environmental setting, and causitive agent factors. The so-called "diseases of life style" often reflect both subtle and gross changes in the balance of these factors.

In addition, epidemiology utilizes experimental design, data gathering and data assessment as well as the compilation of demographic information. These are vital techniques for health promotion in defining the "need" for community and family programming as well as studying the impact of the educational, preventative, and interventative approaches which make up health promotion. Even if a paraprofessional does no evaluation or research themselves, they need to be able to understand the important characteristics of such data when they encounter it in written form or in health planning settings.

The health promotion paraprofessional will need to interact with public health workers and, although less effected by changes in causitive agent dynamics, will nonetheless need to be aware of acute situations in the community or target group where they work. An understanding of the realities of public health practice

will be vital to dealing with professionals in health administration or treatment positions. A thorough grounding in the epidemiological factors of disease will be valuable to the health promotion paraprofessional as they work with other members of the community and family health care team and will make them more effective as they provide support and referral services to individuals and families.

GENERAL OBJECTIVES FOR
A COURSE IN
EPIDEMIOLOGY

Brief catalog description: Epidemiology--3 semester hours

A study of the inter-relationship among organisms, the environment, and man. The course develops an understanding of the history of disease, their signs, symptoms, and prevention. It provides a working knowledge of the terms; morbidity, mortality, acute disease, and chronic disease. Basic data are presented concerning the application of demographics, community health care, and the epidemiologic study of the causal factors of disease.

Objectives:

Unit I. *At the completion of this unit the student should demonstrate mastery of basic epidemiologic fundamentals and score a minimum of 75 percentile on the unit examination.*

Unit II. *At conclusion of this unit the student should have measurable knowledge of the casual relationship of human diseases and attain a minimum of 75 on the unit examination.*

Unit III. *Upon completion of this unit the student should demonstrate proficiency with concepts of the host-parasite relationship and attain a minimum of 75 on the unit examination.*

Unit IV. *As a result of this unit of study, the student should be fimiliar with various host aspects concerning the acquisition or rejection of disease. A minimum score of 75 should be attained on the unit examination.*

Unit V. *At the completion of this unit of study, the student should be knowledgeable of those factors of environmental origin which interact to produce human disease. A score of 75 on the unit examination is considered minimal.*

Unit VI. *As a result of this unit the student should be able to apply and analyze a series of demographic and related data to the human disease experience. Satisfactory conclusion of the unit will be based on the completion of the objectives and a minimum score of 75 on the unit examination.*

Unit VII. *At the conclusion of this unit the student should be familiar with the fundamentals of experimental design, principles of sampling methodology, and techniques of acceptiable result analysis. A minimum score of 75 should be attained on the unit examination.*

Unit VIII. *Upon completing this unit the student will understand that the premise of disease is not a reandom occurrence but exists in patterns. These patterns within individuals form the basis of predictability which may lead to control and prevention. A minimum score of 75 on the unit examination is considered satisfactory.*

Unit IX. *At the conclusion of this unit the student should be able to interrelate geographic concepts with disease causation. Attainment of a score above the 75th percentile is considered satisfactor.*

Unit X. *At the completion of this unit of study the student should have an understanding of disease variation with time as a function of the temporal activity of the cause. A minimum grade of 75 is considered satisfactory on the unit examination.*

Unit XI. *Upon completing this unit of study the student should possess an awareness of the fundamental goals of epidemiologic research. Subject areas include the determination and characterization of the primary agent, transmission and reservior mechanism, integration of contributing factors, and evaluation of preventive measures. A score of 75 on the unit examination is considered minimum.*

Unit XII. *Upon completion of this unit the student should have an insight into the practice of epidemiology, its theory a application methods, personnel, and the total relation of the epidemiologist to community life. The attainment of a score of 75 is considered minimal on the unit examination.*

Unit XIII. *Upon completion of this unit, the student should be able to demonstrate a knowledge of the bacteria and related microorganisms as measured by the completion of the unit objectives and a score of 75 percent on the unit examination.*

Unit XIV. *Following completion of this unit, the student should demonstrate a knowledge of the common viral organisms of humans. Measurement of the degree of mastery will be determined by the ability of the student to satisfactorily completion of the unit objectives and score a minimum of 75 percent on the unit examination.*

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Unit XV. *Upon completion of this unit the student should be familiar with the stated objectives concerning mycology and score a minimum of 75 percent on the examination.*

Unit XVI. *Upon completion of this unit of study, the student should be able to identify the common human protozoans with particular emphasis on the pathogenix species. Performance measures include completion of the specific objectives and a unit examination (minimum score 75).*

Unit XVII. *Following completion of this unit, the student should be able to decribe the etiology of the stated helminths, complete the listed objectives, and demonstrate at least seventy-five (75) percent proficiency on a unit examination.*

GENERAL RECOMMENDATIONS FOR THE INSTRUCTOR

The course in Introductory Epidemiology was designed to be taught in a 14-15 week semester setting for 3 credits. Units are determined by conceptual groupings and do not represent class periods or weeks. It is suggested that more time be spent on the general characteristics and basic themes of epidemiology (e.g. Units two through eleven) and that specific disease causing elements be delt with in general and not in detailed specifics.

Each Unit includes a general objective, a set of specific objectives (sufficiently detailed to serve as a content outline), an Instructor and Student Information Sheet and a Student Assignment sheet suitable for distribution to students. The author has made a specific recommendation for a text; the assignments refer to that text but also include valuable information on how to use the objectives to learn the material most effectively. The objectives serve as a lecture reference for the instructor and are also valuable to the student as overviews or summaries.

Specific examinations have been designed for each unit, deriving from the homework assignments for the students and from the specific unit objectives. Answer keys are also included.

This course can be specialized to a local or state area by the following means:

1. The use of local health department personnel as consultants, to identify the major issues covered in the course which are of particular interest/ concern to the immediate area. This information can be gathered from around the state as well.

2. State health departments and state Universities often

have epidemiological staffs which can not only provide consultation but which regularly disseminate updates on epidemiological data. It is important to find out if such "Epi-Notes" type of newsletters exist in your state and get on the mailing list.

3. The Center for Disease Control in Atlanta, Georgia can often provide up to date information on issues of current national or sub-population concern.

4. Local health departments can often refer you to speakers who are prepared to deal with local issues in detail and answer questions from your class.

In the use of speakers, you are often asking people to work you into already crowed days. The following guidelines can make speakers more useful to you. Arrange things as far inadvance as possible; be specific about your needs and respect the needs and realities of your speaker. Outside speakers give better quality presentation is you provide them with background information on your course, its objectives, your students, and their current level of knowledge. Material from this instructor's guide may be useful to them. With budgets in health care being limited, youcan help by offering to reproduce any handouts for the speaker.

Make your class current by bringing items from national news media when appropriate (e.g. the Legioneers Disease episodes from Philadelphia a few years ago or the more recent AIDS issues. Special areas in the course content which are of particular relevance to health promotion issues include Host Factors - especially defense mechanisms, defense reactions and stress, acquired immunity, human behavioral patterns which effect disease;

and Environmental concerns - especially nutrition issues, allergies, and socioeconomic impact on disease. Unit VI7s descriptions of population data and demographics is of particular use to prevention workers as is the section on experimental design.

While science courses may not lend themselves to special projects, if such are considered, demographic studies by student's of their home communities would be particularly useful, as would contrasts between urban and rural issues which contribute to disease.

In order to facilitate modification, individual comments, notes on classroom experiences and the like, alternate pages in the unit over-views have been left blank.

REFERENCES

Recommended Textbook

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UNIT OVERVIEWS

EPIDEMIOLOGY

UNIT I

INTRODUCTION TO EPIDEMIOLOGY

General Objective

At the completion of this unit the student should demonstrate mastery of basic epidemiologic fundamentals and score a minimum of 75 percentile on the unit examination.

Specific Objectives

The student will be able to:

1. Define the following terms:
   A. carriers (chronic)
   B. communicability (period of)
   C. endemic
   D. epidemic
   E. epidemiology
   F. etiology (etiologic)
   G. incubation period
   H. pathogen
   I. placebo

2. Cite the most important concern of epidemiology.

3. Describe three (3) examples of early epidemiologic work by Fleming, Jenner, and Snow.

4. A. Identify the first step taken by an epidemiologist in the study of any particular disease.
   B. Compare the sequential process of epidemiologic investigation to the scientific method.

5. Contrast retrospective to prospective studies in epidemiologic investigations. Cite examples.

6. Identify why epidemiology is often referred to as a method rather as an independent science

7. A. Define demography.
   B. Cite the role of demoghaphics in epidemiology.

8. A. Identify the individual who is regarded as the father of clinical medicine and the first true epidemiologist.
   B. Describe his major contributions to the field of epidemiology.

9. Identify the role of each of the following in epidemiology:
   A. Galen (129-199 A.D.)
   B. Francastorius (1478-1553)
   C. Sydenham (1624-1689)
   D. Webster (1758-1843)
   E. Graunt (1620-1674)
   F. Pasteur (1822-1895)
   G. Lister (C. 1865)
   H. Koch (1843-1810)

10. Cite some examples of non-infectious diseases which are becoming of increasing interest to epidemiologists.

11. Define:
   A. communicable
   B. contagion
   C. immunity
   D. incidence
   E. infection
   F. parasite
   G. prognosis
   H. vector
   I. vital statistics

Unit I

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with objective sheet for this unit.
   b. Provide each student assignment/information sheet.
   c. Discuss unit and specific objectives in class (see #2 below).
   d. Administer unit examination upon completion of the specific objectives.
   e. Emphasize that the unit examination will include only that information as found in the unit and specific objectives.

2. Suggested activities for completion of specific objectives:
   a. Assign the definition in specific objective #1 and discuss during next lecture period. Information for this unit is to be found in Chapters 1 and 2 of lecture textbook.
   b. Insure that adequate mastery of specific objectives numbers 2-8 are accomplished through lecture and class discussion.
   c. Assign objective 9 and 11 to be completed by the student. Insure that all information is assimilated through class discussion.
   d. Objective #10. Discuss the expanding role of the epidemiologist to include recent interest in non-infectious diseases such as coronary heart disease, diabetes, cancer, mental illness, and etc.

3. Instructional Materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Unit examination
   d. Unit examination answers

Unit I

Student Assignment:

1. Read Chapters 1 and 2 in textbook.

2. Complete objectives number 1, 9, and 11 and be prepared for class discussion.

3. Familiarize yourself with the remainder of the specific objectives and prepare to participate in class discussion.

4. Insure that adequate notes are taken from classroom and assignments to insure your mastery of the unit and specific objectives.

5. Unit examinations are drafted from the unit and specific objectives and will be administered upon completion of the unit.

UNIT II

DISEASE CAUSATION: GENERAL CONCEPTS AND THE NATURE AND CLASSIFICATION OF DISEASE AGENTS

General Objective

At the conclusion of this unit the student should have measurable knowledge of the casual relationship of human deseases and attain a minimum score of 75 on the unit examination.

Specific Objectives

The student will be able to:

1. Cite evidence to indicate that the statement, "the primary cause is the only important cause of disease", is not often valid. Use human tuberculosis as an example.

2. Describe the major factors which may interact to produce disease in humans.

3. Describe what is meant by the "web of causation".

4. As related to microbial causative agents, describe three (3) factors which may determine their ability to cause disease.

5. Describe those factors of the host which may affect onset of disease.

6. Describe three (3) factors of the environment which may interact to produce diseases in humans.

7. Illustrate graphically the ralationship between agent, host, and environment in human diseases.

8. Define: agent (of disease)

9. Describe the following known or potential disease agents:
   A. nutritive elements
   B. exogenous chemical agents
   C. endogenous chemical agents
   D. physiologic factors
   E. genetic factors
   F. psychic factors
   G. physical factors
   H. parasites

10. Define:
    A. allergen
    B. disease
    C. latent (infection)

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Insure that each student has received the unit and specific objectives.
   b. Provide each student with the assignment/information sheet.
   c. Cover unit and specific objectives in class (see #2 below).
   d. Administer unit examination upon completion of unit and specific objectives.
   e. All students should realize that the unit examination is drawn from and includes only the material as contained in the unit and specific objectives.

2. Suggested activities for completion of specific objectives:
   a. Stimulate discussion concerning objective #1, emphasizing that in disease such as tuberculosis, causation is rarely single or simple.
   b. Objective #2. Three general factors interact to produce disease in humans: the agent, the host, and the environment. Insure adequate coverage in class by explaining, in general, the role each plays in disease causation.
   c. Assign objective #3 as a student activity to be followed by discussion next lecture. This objective should allow the student to realize the complex interrelationships of disease causation.
   d. Objectives 4-6. Stimulate class discussion so that causative factors relevent to agent, host, and environment are well understood.
   e. Objective #7. Utilize over-head projector (Vu-Graph) to illustrate graphically the contributing factors in disease (refer to pg. 35 in text for examples).
   f. Objective 8-10. Student assignment. Follow-up with discussion in class.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as indicated)
   d. Unit examination
   e. Unit examination answers

Unit II

Student Assignment:

1. Read Chapter 3 in textbook.

2. Objectives 1-2. Be prepared for class discussion.

3. Objective #3. Complete this objective outside of class. Insure that you assimilate the "web" concept of disease causation. Be prepared to elaborate in class.

4. Objective 4-6. Familiarize yourself through your own study with these objectives. You should understand the interrelationships of host, agent, and the environment in disease causation.

5. Objective #7. Apply the factors of agent, host, environment graphically. This will be covered in class.

6. Objectives 8-10. Look up definitions/descriptions in textbook or references. Be prepared to participate in class discussion.

UNIT III

AGENT FACTORS IMPORTANT
TO DISEASE OCCURRENCE

General Objective

Upon completion of this unit the student should demonstrate proficiency with concepts of the host-parasite relationship and attain a minimum of 75 on the unit examination.

Specific Objectives

The student will be able to:

1. Discuss the two (2) most obvious intrinsic properties of microorganisms.
2. Describe the importance of the antigenic character of microorganisms.
3. Identify those factors which determine the long-term survival of parasite.
4. Identify what is meant by the specificity (host range) of a parasite.
5. Relate the medical significance of mutability of pathogenic microbes.
6. Cite an example of a microbe's ability to undergo a change in antigenic character.
7. Cite examples to support the following statements:
   A. some diseases tend to decline in severity over a period of years.
   B. emergence of apparently new pathogens.
   C. adaptation of a parasite to a new reservoir host.
8. Contrast infection to infestation. Give examples.
9. Describe:
   A. secondary attack rate
   B. case fatality rate
10. Cite the major factors associated with the infectivity of a microbe.
11. Cite the major factors influencing the pathogenicity of a microbe.

12. Contrast the terms pathogenic and virulence.

13. Compare the secondary attack rate, pathogenicity, and virulence of some common human infectious deseases.

14. Describe the variable aspects of antigenicity (immunogenicity) of microbes.

15. Schematically diagram the stages of microbial infection in a suitable host. Emphasize the following: latent and incubation periods, patent and communicability periods.

16. Define:
    A. microbial reservoir (cite examples)
    B. zoonosis
    C. epizootic
    D. recrudescent infection

17. When considering the transmission of infectious agents, compare the ralationship of agent, avenue of escape, conveyance, and portal of entry (use example)

18. Cite the major portals of entry to infectious microbes in humans.

19. Discuss the following statements:
    A. parasites and their hosts have evolved together.
    B. the longer the association (in geologic time) between the host and parasite the more benign the desease.

20. Contrast an intermediate to a definitive host.

21. Define:
    A. antibody
    B. antigen
    C. antiserum
    D. enteric
    E. exanthem
    F. extrinsic incubation period
    G. exotoxin
    H. fomite
    I. mutation
    J. obligate parasite

Unit III

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with unit objective sheets.
   b. Insure that each student receives the assignment/ information sheet.
   c. Conduct a thorough discussion of unit and specific objectives in class (see #2 below).
   d. Administer the unit examination upon completion of all specific objectives.
   e. Each student should understand that the unit examination will test mastery of the unit and specific objectives.

2. Suggested activities for completion of specific objectives:
   a. In order to sufficiently develop the correct responses to the specific objectives of this unit, it will be necessary that you direct most class activities. Due to the technical nature of the materials, it is suggested that you employ lecture, lecture-discussion, and visual aids to assist in this process. It is essential that the student gain an awareness of agent factors in disease causation, as this background will provide the framework for his later endeavors.
   b. Thoroughly acquaint yourself with Chapter 3 of the textbook as the specific objectives are drawn from this area.
   c. Include in your discussion of the objectives any relevant examples. This will provide the continuity with in the objective and enhance student comprehension.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Unit III

Student Assignment:

1. Read Chapter 3 in course textbook.

2. Attempt to correlate specific objectives with text material prior to classroom presentation by the instructor.

3. Your mastery of the objectives concerning agent factors in disease causation will be important for successful completion of the unit examination and will be used later in the course.

4. Insure that each objective is addressed in class with sufficient discussion to completely understand the concepts and requirements. Your performance can be enhanced by diligent preparation, note-taking, review, and pertinent questions.

UNIT IV

HOST FACTORS IN CAUSATION OF DISEASE

General Objective

As a result of this unit of study, the student should be familiar with various host aspects concerning the acquisition or rejection of disease. A minimum score of 75 should be attained on the unit examination.

Specific Objectives

The student will be able to:

1. Name the three (3) possible consequences which can occur as a result of an exposure to an infectious agent.

2. Other than survival, describe three (3) aspects of the outcome of infection of particular importance to the host.

3. Discuss the structural and functional aspects of host defense mechanisms.

4. Describe the role(s) of the following in the defense mechanism of the host:
   A. inflammation
   B. phagocytes
   C. lymphatic system
   D. antibodies
   E. interferon

5. Describe how the following factors influence the occurrence of infectious diseases in humans.
   A. age
   B. sex
   C. ethnic group
   D. family

6. The following factors are influential in the host reaction to desease agents. Describe them.
   A. physiological state
   B. nutritional states
   C. intercurrent disease
   D. stress

7. Define:
   A. natural immunity
   B. artificial immunity
   C. resistance

8. Immunologic response in humans has two (2) principle results. Describe them.

9. As related to the acquisition or formation of antibodies, describe the following:
   A. naturally acquired active immunity
   B. naturally acquired passive immunity
   C. artifically acquired active immunity
   D. artificially acquired passive immunity

10. Describe what is meant by herd immunity.

11. Discuss why it would be desirable to know the proportion of a population of humans (or other animals) that must be immune in order to render the spread of infection highly improbable.

12. Describe the effectiveness of the following in disease prevention:
   A. immunity resulting from natural infection
   B. immunity induced by vaccination
   C. passive immunity

13. Relate how the following human behavioral patterns may influence acquisition of disease:
   A. use of water
   B. diet and food handling
   C. disposal of waste
   D. personal hygiene
   E. personal contact
   F. household hygiene
   G. occupation
   H. recreation
   I. utilization of medical care
   J. individual traits

14. Define:
   A. anaphylaxis
   B. attack rate
   C. auto-immune disease
   D. case fatality rate
   E. half-life
   F. immunologic tolerance
   G. interference phenomenon
   H. lymphocyte
   I. serum sickness
   J. subclinical infection
   K. toxoid
   L. vaccine

Unit IV

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the objective sheet for this unit.
   b. Insure that each student receives a copy of the assignment/information sheet.
   c. Thoroughly discuss each specific objective in class to insure coverage of major teaching points. (see item #2 below).
   d. Administer the unit examination upon completion of the specific objectives.
   e. Each student should be aware that the unit examination is drawn from the specific objectivesof the unit.

2. Suggested activities for completion of specific objectives:
   a. You should, as the instructor, insure that each student maintains his or her pace which will be consistent with mastery of the behavioral objective. That is, coordinate class activities that will allow all students to have adequate exposure to the material in order to develop proficiency.
   b. Utilize class participation methods, discussion, lecture, and visual aids to cover objective subject materials. Emphasize the importance of out-of-class study to enhance mastery. Encourage questions at any time during presentation of subject matter.
   c. Due to the large number of objectives in this unit, you will find it necessary to cover the material expeditiously. Do not sacrifice thoroughness and accuracy for speed, however. Gear the conduct of the class in such a manner that your accelerated students are challenged without discouraging the slower ones.
   d. The objectives in this unit are relevent to the variables in an individual in the disease process and as such will form the basis of individual disease patterns to the student. You may want to assign objective 14 to be accomplished by the student, to be followed by class discussion.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Student Assignment:

1. Read Chapter 5 in course textbook.

2. Correlate as many objectives with the text material as you can prior to class.

3. This unit deals with the variable host factors associated with disease and so such will be important to you not only later in the course but after its completion. Be prepared for each class. The nature of the objectives is such that you may take time necessary for mastery at home. Ask questions, be alert, and be responsive.

4. When faced with the mastery of a considerable volume of information as this unit is, utilize your own self-discipline, study groups, and particularly your own notes to develop your skills.

5. Concentrate on objective-learning (not necessarily memorization). Remember that the unit examination is drawn from the specific objectives.

6. Obtain the definitions in objective #14 from the textbook and reference sources. Be prepared to discuss them in class.

UNIT V

ENVIRONMENTAL FACTORS IN
CAUSATION OF DISEASE

General Objective

At the completion of this unit of study, the student should be knowledgeable of those factors of environmental origin which interact to produce human disease. A score of 75 on the unit examination is considered minimal.

Specific Objectives

The student will be able to:

1. Identify the three (3) broad areas of concern when dealing with environmental factors and their relation to disease.

2. Cite reasons to illustrate the difficulty in evaluating environmental factors in disease causation.

3. The following are factors of the physical environment that may influence disease causation. Describe each of them.
   A. geoghaphy and geographic epidemiology
   B. geologic factors
   C. climate

4. Describe the role(s) of the biologic environment in disease causation. Include in your description the following:
   A. Nutritive components
   B. agriculture
   C. plant allergens and toxins
   D. microbes/parasites
   E. manipulation of biologic environment
   F. biocides

5. Describe how each of the following socioeconomic factors relate to disease causation.
   A. population distribution
   B. social and political structure
   C. state of economic development

Unit V

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Insure that each student receives a unit objective sheet.
   b. Provide each student with an assignment/information sheet.
   c. Thoroughly discuss unit and specific objectives in class (see item #2 below).
   d. Give the unit examination at the conclusion of this unit.
   e. Inform all students that the unit examination will include only that information as required by the objectives.

2. Suggested activities for completion of specific objectives:
   a. Environmental aspects of disease causation are complex, and when coupled with agent and host parameters present a subject that will require your guiding influence.
   b. You may wish to make a reading assignment of Chapter #6 well in advance of class coverage. Once the material is covered in class, insure maximum student participation and encourage questions. These objectives can best be managed in a discussion, "total" involvement atmosphere. Include as many examples as possible to insure understanding and comprehension.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Unit V

Student Assignment:

1. Read Chapter #6, course textbook.

2. Attempt through your own study to correlate specific objectives with text material.

3. Be prepared for class discussion in advance of presentation by the instructor. Doing so will maximize your efforts in objective mastery.

4. Consideration of environmental factors in disease causation necessarily involves a wide range of subjective data. Successful completion of the objectives will hinge on your ability to synthesize this data relative to the objective format.

5. In class, be prepared for active discussion, pertinent questions, and maintain relevant notes.

UNIT VI

VITAL STATISTICS

General Objectives

As a result of this unit the student should be able to apply and analyze a series of demographic and related data to the human disease experience. Satisfactory conclusion of the unit will be based on the completion of the objectives and a minimum score of 75 on the unit examination.

Specific Objectives

The student will be able to:

1. Cite the three (3) principle roles of the epidemiologist in human disease situations.

2. Describe the decennial census in the U.S. to include the major items surveyed.

3. Describe the following as related to the U.S. census:
   A. Standard Metropolitan Statistical Areas (SMSA)
   B. Standard Consolidated Area

4. Identify those items in the U.S. census where most errors occur.

5. State how census information can be useful to the epidemiologist.

6. Four (4) vital events in the human experience are required by state law to be registered. Describe these vital events and the process by which they are utilized by health officials.
   A. Define birth rate
   B. Calculate the birth rate of a population when provided with the necessary statistics
   C. Correctly analyze a graph of birth rate data when provided with suitable graphic illustrations.

8. Describe how a fertility ratio of a population is calculated.

9. A. Define crude death rate
   B. Calculate the crude death rate of a population when provided the necessary data
   C. Be able to interpret death rate data graphically

D. Contrast death rates by occurrence and by residence
E. Describe death rates as they apply to the following: race, sex, and age.
F. Show how age-specific death rates are calculated and describe the value of obtaining such a statistic.

10. Define standardized mortality ratio, calculate by formula, and describe the importance of deriving the statistic.

11. Describe and give an example of a cause-specific death rate.

12. Define and interpret graphical data on the following:
A. proportional mortality rate (and adjusted PMR)
B. case fatality rate
C. infant mortality rate
D. neonatal death rate
E. fetal death ratio (FDR)
F. perinatal mortality rate (PerMR)
G. maternal mortality rate (MMR)

13. As related to the impact of chronic diseases in human populations contrast prevalence and incidence rates in specific populations.

14. Illustrate how the secondary attack rate (SAR) may be a useful statistic to the epidemiologist.

15. A. Interpret the life table functions of survivorship and average life expectancy (with the aid of appropriate graphs).
B. Of what benefit can the life tables be to an epidemiologist?

Unit VI

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the unit and specific objectives.
   b. Provide each student with assignment/information sheet.
   c. Insure coverage of unit objectives in class. (see item #2 below).
   d. Give the unit examination upon completion of objectives.
   e. All students should be aware that the unit examination is drawn from and includes requirements from the unit and specific objectives.

2. Suggested activities for completion of specific objectives:
   a. This unit represents one of the more quantitative areas in the course. Successful mastery by the student will require your diligence and effective classroom techniques.
   b. Assign Objective 1-6 to be completed by the student. Follow up with classroom discussion where it will be appropriate to emphasize major points. You may wish to utilize graphic aids (Vu-Graph) illustrating the vital events of birth and death. Refer to pg. 117 and 119, respectfully.
   c. Objective 7. Cover in class. Illustrate calculations of birth rate and data interpretation. Use overhead projection for examples from text or other resources.
   d. Objective 8. Contrast birth rate to fertility rate. Emphasize the relative importance fertility rate data.
   e. Objective 9. Show how death rate data is calculated and interpreted. Illustrate by use of overhead projection taken from many examples in textbook (pg. 129-137).
   f. Objective 10. Describe the value of in SMR. Use graphics from page 138 to illustrate.
   g. Objective 11. Explain the value of cause specific death rates. Use data obtained from page 140 with overhead projector from description.
   h. Objective 12. Use appropriate formula and graphics (visual aids) to emphasize the listed statistics. Refer to pages 140-147 for examples.
   i. Objective 13. Differentiate between prevalence and incidence rates. Emphasize by means of equations. References page 147.

j. Objective 14. Secondary attack rate has previously been defined. Now, show how it can be calculated and its use to the epidemiologist.
k. Objective 15. Insure the preparation of good graphics to illustrate the survivorship and life expectancy curves. Contrast each for male and female. Refer to pages 150-152 for excellent examples. Emphasize that life tables can be of value to the epidemiologist in showing the general health status of a population.

3. Instructional materials:
   a. Unit and specific objective
   b. Student assignment/information sheet
   c. Visual aids (as appropriate and where mentioned)
   d. Unit examination
   e. Unit examination answers

Student Assignment:

1. Read Chapter 7 of textbook.

2. Objectives 1-6 are to be accomplished by you outside of class. Attempt to assimilate the necessary responses to each objective. If you do not answer all of them or fail to understand any portion, they will be covered in class. Be sure to participate and ask questions.

3. Objectives 7-15. These objective will be part of the classroom presentation. In order to maximize your mastery of the requirements, try to do the following:
   A. Be prepared for each class. It is particularly important here since the material is of a quantitative nature.
   B. Review and study after each class. Do not wait until all of the material has been presented to study - there is simply too much information to digest at one time.

4. Study all graphics presented by the instructor. Your ability to interpret data will be tested. Most graphs, tables, etc. will be drawn from your textbook, however, if others are used - ask for sources.

UNIT VII

EXPERIMENTAL DESIGN, SAMPLING, AND DATA ANALYSIS

General Objective

At the conclusion of this unit the student should be familiar with the fundamentals of experimental design, principles of sampling methodology, and techniques of acceptable result analysis. A minimum score of 75 should be attained on the unit examination.

Specific Objectives

The student will be able to:

1. Describe the five (5) most common errors encountered in experimental studies.
2. Cite the basic principles for sampling human populations.
3. Cite the need for and the significance of formal random sampling devices.
4. Describe the use of a table of random numbers.
5. Describe basic probability as the fundamental principle of chance occurrence.
6. Describe tests of significance and confidence intervals as tools of data analysis.
7. Explain the importance of the test of significance related to sample size in attributing reliability to data analysis.
8. Discuss the advantages which can be obtained by sequential experimentation.

Unit VII

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with unit and specific objectives.
   b. Provide each student with an assignment/information sheet.
   c. Insure coverage of all specific objectives in class. (see item #2 below).
   d. Administer unit examination upon completion of specific objectives.
   e. The students should realize that the examination is drawn from and restricted to requirements of the objectives.

2. Suggested activities for completion of specific objectives:
   a. Objective 1-3. Assign for student completion. Include class discussion later to cover major points.
   b. Objective 4. Illustrate use of table of random numbers. You may wish to supplement text examples with expanded table from other reference sources.
   c. Objective 5. Review basic principles of probability utilizing dice throws; you may wish to use colored balls, beans, coins, etc.
   d. Objective 6-8. Cover thoroughly in class. Use adequate examples to illustrate tests of significance and confident intervals.

3. Instructional materials:
   a. Unit and specific objectives.
   b. Student assignment/information sheets.
   c. Visual aids (dice, colored balls, beans, or coins for probability exercises).
   d. Unit examination
   e. Unit examination answers

Student Assignment:

1. Read Chapter 8 in course textbook.

2. Prepare for class presentation and discussion by completing as many objectives as you can. Draw on your past mathematical background to assist you in the probability areas. If you experience trouble be sure to put forth the extra effort and ask the instructor for assistance.

3. Objective 1-3. Complete outside of class. Insure that your understanding is sufficient to participate in class discussion.

4. Objective 4-8. To be covered in class by the instructor. Prior preparation and review will help you in this area.

UNIT VIII

PATTERNS OF INDIVIDUAL DISEASE OCCURRENCE

General Objective

Upon completing this unit the student will understand that the premise of disease is not a random occurrence but exists in patterns. These patterns within individuals form the basis of predictability which may lead to control and prevention. A minimum score of 75 on the unit examination is considered satisfactory.

Specific Objectives

The student will be able to:

1. Cite the importance to the epidemiologist of classifying diseases according to the clinical manisfestations (include 2 basic principles).

2. Name the major factors that effect the occurrence, severity, and outcome of disease in the individual.

3. Identify the personal characteristics most strongly related to human disease.

4. Name the three (3) methods best used to analyze disease patterns related to age.

5. Identify the ratio of male to female births in the U.S.

6. Of the following diseases, indicate whether there is a male or female preference and justify your response (if possible).
   A. death rate
   B. poliomyelitis
   C. morbidity
   D. fatal diabetes
   E. peptic ulcer, coronary heart disease
   F. diabetes, hyperthyroidism, obesity
   G. gallbladder, biliary tract disease
   H. acute respiratory disease, hypertension, arthritis
   I. lung cancer, liver cirrhosis

7. A. Identify those individuals who possess the greatest degree of genetic similarity.
   B. Distinguish between monozygotic and dizygotic twins.

8. As related to ethnic origin and family genetic history, describe the target group of the following and provide a plausible explanation (if possible).
   A. hemophilia, color blindness, pattern baldness
   B. diabetes, arteriosclerosis, arthritis
   C. sickle cell anemia
   D. tuberculosis, hypertension, rickets
   D. coronary heart disease, skin cancer

9. Describe the following diseases (with possible explanations) as a function of parental age, birth order, and family size.

10. Census records indicate some disease occurrence varies with the marital status of an individual. Comment on the following diseases:
   A. osteoarthritis
   B. rheumatoid arthritis
   C. coronary heart disease
   D. chronic disease (general)

11. When one encounters the term, occupation, in a census or related form what other implied attributes may be construed?

12. Cite examples to illustrate the relationship of occupation to disease.

UNIT VIII

INSTRUCTOR & STUDENT INFORMATION

Recommedations for the Instructor:

1. Activities
   a. Insure that each student receives a copy of the objectives.
   b. Provide each student with an assignment/information sheet.
   c. Direct class activities so that the unit and specific objectives can be mastered by the student. (see item #2 below).
   d. Administer unit examination upon completion of the objectives.
   e. Each student should realize that the unit examination is drawn from and limited to the objectives of the unit.

2. Suggested activities for completion of specific objectives:
   a. Objective 1-5. Assign for student completion outside of class. Follow-up later with class discussion. These objectives are of a general/principle nature and will require your guidance in the classroom.
   b. Objectives 6-12. Cover thoroughly in class. These objectives are designed to enlighten the student as to the patterns of disease associated with sex, ethnic origin, family genetic history, parental age, marital status, etc. Adequate examples are cited on the objective sheet. Your expertise and guidance will be needed to explain the preferential pattern of disease within these groups.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

UNIT VIII

Student Assignment:

1. Read Chapter 9 in course textbook.

2. Prepare for class in advance by attempting to complete as many objectives as possible.

3. Objectives 1-5. Instructor will assign these objectives for you to complete outside of class. If you encounter problems seek assistance from the instructor. Your questions can probably be answered during classroom discussion.

4. Objective 6-12. These will be covered in detail by the instructor. Note the content disease patterns within various groups; male, female, ethnic origin, family, genetics, marital status, etc. Completion of these objectives will necessitate the use of a large number of examples and explanations. Be sure to take adequate notes and review them periodically.

UNIT IX

PATTERNS OF DISEASE
OCCURRENCE - PLACE

General Objective

At the conclusion of this unit the student should be able to interrelate geographic concepts with disease causation. Attainment of a score above the 75th percentile is considered satisfactory.

Specific Objectives

The student will be able to:

1. Identify those factors which are most important when one refers to the geographic concept - place.

2. Name the organization responsible for collecting a disseminating morbidity data worldwide.

3. Cite the smallest area for which demographic data is available.

4. Describe how local outbreaks of a disease can be graphically plotted.

5. Name the three (3) resident classifications used by the Census Bureau in the U.S.

6. Describe the historical pattern of human disease in the three (3) regions mentioned in #5.

7. What are the most important factors when considering global patterns of diseases?
   Environmental factors: climate, altitude, plant and animal life, etc.

8. Describe geographic and other factors which may contribute to the spread of the following diseases:
   a. epidemic typhus - Rickettsia Prowazekki - vector human louse which lives in clothing; major factors - cool climate and poverty.
   b. murine typhus - another Rickettsia transmitted by rat flea (Xenopsylla cheopis) - warm climate.
   c. cholera - Vibrio cholerae (bacteria); personal contact from areas of poor sanitation.
   d. influenza - caused by viruses A, B, C - can change genetically every few years; may be endemic in some populations because epidemic, then pandemic.

9. How have contries such as England and Australia eradicated rabies?

10. Describe how hepititis and poliomyelitis have successful attack rates in both the southern and northern U.S.

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Insure that all students receive the objectives for this unit.
   b. Provide each student with the assignment/information sheet.
   c. Through class discussion and activities, insure student mastery of the objective. (see item #2 below).
   d. Upon completion of the objectives, administer the unit examination.
   e. Each student should realize that the unit examination is drawn from and is restricted to the objectives of the unit.

2. Suggested activities for completion of specific objectives:
   a. Assign Chapter 10 in textbook as required reading prior to class coverage.
   b. Encourage the students to complete the objectives on their own. Follow-up with class discussion at which time you may include the necessary examples to illustrate major points.
   c. In consideration of geographic factors in disease causation you will find a great deal of conceptual-type principles. Emphasize this approach, allowing the students to develop examples along the objectives guidelines.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Unit IX

Student Assignment:

1. Read Chapter 10 in course textbook.

2. The instructor will assign the objectives in this unit to be completed outside of class.

3. Insure that you make every attempt to complete the objectives prior to initiation of class activities on this unit.

4. Class discussion in this unit will pivot around concepts and principles associated with the influence of geographic factors and disease causation. Prior preparation will not only assist you in the comprehension aspect of these concepts but will allow you to draw upon your experiences for examples.

5. As in other units, the examination will be drawn from the objectives of the unit under study.

UNIT X

PATTERNS OF DISEASE
OCCURRENCE - TIME

General Objective

At the completion of this unit of study the student should have an understanding of disease variation with time as a function of the temporal activity of the cause. A minimum grade of 75 is considered satisfactory on the unit examination.

Specific Objectives

The student will be able to:

1. State units of time are best suited for disease occurrence data.

2. Discuss the advantages and disadvantages of using mortality as an index of time trends in disease occurrence.

3. Define and contrast the terms endemic and epidemic in the context of the advent of disease over time in a defined place.

4. Recognize when it is appropriate to use the term "outbreak" in reference to the appearance of a disease.

5. Explain how knowledge of the incubation period of infectious agents can be useful to the epidemiologist.

6. State variable of the incubation periods of infectious diseases under natural conditions?

7. Name the epidemiological method used to correlate incubation periods of disease.

8. A. Identify what epidemiologists refer to as a "point" epidemic.
   B. Cite some examples and characteristics of "point" epidemics.

9. Cite two (2) examples of "continuing source" outbreaks

10. A. Name some important factors associated with the seasonal variation of some diseases.
    B. Cite some examples of seasonally variable diseases (include some non-infectious examples).

11. State time of the year characterized by the highest mortality rate (in the U.S.) Explain.

12. Describe the use of cyclic variation data and epidemiologic year calendars in disease analysis.

13. Describe the use of cohorts and cohort analysis in disease data evaluation.

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the objectives.
   b. Insure that each student obtains an assignment/information sheet.
   c. Discuss the objectives thoroughly in class. (see item #2 below).
   d. Administer unit examination upon completion of the objectives.
   e. Examination will be taken from the unit and specific objectives.

2. Suggested activities for completion of specific objectives:
   a. As outlined in the behavioral objectives it is important for the student to have an understanding of temporal relationships of diseases. Emphasize all definitions, descriptions related to temporal data.
   b. Assign Chapter 11 from course textbook as an reading requirement.
   c. Encourage the students to complete as many objectives as they can. The more they can accomplish outside of class, the more you can accomplish in class.
   d. Cover all objectives thoroughly as part of your class activities. Sufficient latitude is present within the objective framework to allow expansion of examples drawn from your sources and the students.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aid (as appropriate)
   d. Unit examination
   e. Unit examination answers

Unit X

Student Assignment:

1. Read Chapter 11, course textbook.

2. Prepare for class activities by completing as many of the objectives as you can.

3. In your study, concentrate on definitions, descriptions dealing with the temporal aspects of disease. Examples would be: outbreaks, point epidemics, incubation period, etc.

4. Concentrate on objective mastery - the unit examination is drawn from them.

5. If you encounter problems - see your instructor.

UNIT XI

THE NATURE OF EPIDEMIOLOGIC RESEARCH

General Objective

Upon completing this unit of study the student should possess an awareness of the fundamental goals of epidemiologic research. Subject areas include the determination and characterization of the primary agent, transmission and reservoir mechanism, intergration of contributing factors, and evaluation or preventive measures. A score of 75 on the unit examination is considered minimum.

Specific Objectives

The student will be able to:

1. State the major goals of epidemiologic research.

2. A. Name two (2) categories of epidemiologic research based on location
   B. Name two (2) categories based on methodology.
   C. What combination of the above represents the bulk of research activities today.

3. Summarize the major objectives of laboratory based epidemiologic research.

4. Summarize the role of experimental epidemiology in disease research (include the use of experimental and control groups, and formal randomization).

5. What major problem is often encountered in experimental epidemiology?

6. A. State the conditions under which human populations are utilized experimentally.
   B. Identify those experimental studies which are most common with human subjects.

7. Describe computer simulated techniques of experimental epidemiology.

8. State conditions under which epidemiologic surveys are conducted.

9. A. Describe a sero-survey
   B. Desceibe two (2) sero-surveys of particular significance in human epidemiology.

C. Discuss the role the sero-survey may have in identifying future human pathogens.

10. Summarize the role of disease surveys in epidemiologic research.

11. Describe the surveillance technique of disease research.

12. Contrast the retrospective (case-history) analytic study to the prospective (cohort) approach to disease analysis.

Unit XI

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with objectives.
   b. Provide each student with assignment/information sheet.
   c. Insure coverage of all objectives during class activities.
   d. The unit examination will be drawn from the specific objective of the unit.

2. Suggested activities for completion of specific objectives:
   a. Assign Chapter 12 in course textbook as a reading requirement prior to class coverage of objectives.
   b. Encourage the students to complete as many of the objectives as they can prior to class.
   c. Emphasis on this unit's objectives lies in the contribution research has made to the field of epidemiology. Through the appropriate use of examples, definitions, and descriptions illustrate the methodology of these contributions.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Unit XI

Student Assignment:

1. Read Chapter 12 in course textbook.

2. Complete your preparation prior to classroom activities by answering as many objectives as you can.

3. The objectives of this unit deal with the impact of research on the field of epidemiology. All aspects of disease causation are dealt with: agent, host, and environmental factors. The research epidemiologist must consider all sources of causal factors in the evaluation of disease. Concentrate on the methodology of these research activities.

4. Complete your objective responses from class activities. Suppliment your study materials with adequate notes.

5. Review objectives periodically prior to unit examination.

6. The unit examination will be taken from the unit and specific objectives.

UNIT XII

TH E PRACTICE OF EPIDEMIOLOGY

General Objective

Upon completion of this unit the student should have an insight into the practice of epidemiology, its theory application methods, personnel, and the total relation of the epidemiologist to community life. The attainment of a score of 75 is considered minimal on the unit examination.

Specific Objectives

The student will be able to:

1. State (a). academic discipline most closely allied with epidemiology.
   (b). Vocations include the bulk of the epidemiologists in the U.S.
   (c). for whom most epidemiologist work

2. Describe why the practice of epidemiology is called a "public" practice.

3. Describe the team nature of epidemiologic work.

4. Identify the primary occupation of the practicing epidemiologists.

5. Explain the data flow chart as a useful tool of the epidemiologist.

6. Describe the value of contingencies of morbidity reporting.

7. Define/discuss the role of the epidemiologist in future societies.

Unit XII

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Insure that each student receives the objectives for this unit.
   b. Provide each student with the assignment/information sheet.
   c. Cover all objectives in class. Insure thorough discussion of material. Encourage class participation.
   d. Administer unit examination at the conclusion of of class activities for this unit.
   e. The unit examination is drawn from the objectives.

2. Suggested activities for completion of specific objectives:
   a. Assign Chapter 13 as reading requirement prior to class coverage.
   b. Encourage the students to complete as many objectives as possible prior to class. Good preparation before class will allow you greater time to expand concepts and increase class participation.
   c. Cover objectives 1-7 in class. Be sure to allow adquate time for presentation of examples drawn from your sources and student experience. Use pages 319-320 in course textbook for visual aid presentation of data flow charts and contingencies of reporting information.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (use overhead projector and graphic aids taken from pages 319-320, course textbook).
   d. Unit examination
   e. Unit examination answers

Unit XII

Student Assignment:

1. Read Chapter 13, course textbook.

2. Complete as many objectives as you can prior to class.

3. The objectives of this unit deal with the major roles of the epidemiologist in community health. Insure that you prepare adequately for class discussion by familiarization with the objectives and citing as many examples of the concepts as you can.

4. Maintain a good set of notes and review them periodically before the unit examination.

UNIT XIII

BACTERIA

General Objective

Upon completion of this unit, the student should be able to demonstrate a knowledge of the bacteria and related microorganisms as measured by the completion of the unit objectives and a score of 75 percent on the unit examination.

Specific Objectives

The student will be able to:

1. Discuss the placement of bacteria in the classification scheme of living organisms.

2. Describe the three (3) basic bacterial shapes, their variations and arrangements.

3. List and describe three (3) types of protection against infectious disease in humans.

4. Describe the etiology, pathology of the following bacteria transmitted by direct contact:
   A. Neisseria gonorrhoeae
   B. N. Meningitidis
   C. Treponema pallidum spp.
   D. Bordatella pertussis
   E. Staphylococcus spp
   F. Streptococcus spp
   G. Diplococcus spp

5. Discuss the etiology, pathology of the following bacteria related to foodborne and waterborne transmission:
   A. Salmonella typhosa
   B. Salmonella spp
   C. Shigella dysenteriae
   D. Brucella abortus
   E. Staphylococcus aureus
   F. Clostridium botulinum
   G. Vibrio cholerae

6. Discuss the human coliform bacteria and illustrate their role as environmental indicators of human pollution.

7. Describe the etiology, pathology of the following airborn-transmitted bacteria:

A. Corynebacterium diphtheria
B. Mycobacterium tuberculosis

8. The following bacteria may be transmitted through inoculation. Describe their etiology and pathology.
   A. Pasteurella pestis
   B. Clostridium tetani
   C. C. perfringens

9. Cite the two (2) major sources of bacteria in milk.

10. Describe five (5) diseases that can be transmitted in milk.

11. Name nine (9) common contaminants of milk.

12. Describe the process of pasteurization and the principle reason for its use.

13. Contrast bacterial exotoxins to endotoxins.

14. Describe how a food infection differs from food poisoning.

15. Review the gram reaction.

16. Describe the rickettsial organisms.

17. Describe the etiology pathology of the following rickettsial diseases:
   A. psittacosis
   B. Q fever
   C. Rocky Mountain Spotted Fever
   D. Typhus

Unit XIII

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the unit and specific objectives.
   b. Provide each student with the student assignment/ information sheet.
   c. Insure coverage of all objectives during class activities. (see item #2 below).
   d. Administer unit examination upon completion of the unit objectives.
   e. All students should realize that the unit examination is drawn from and restricted to the specific objectives.

2. Suggested activities for completion of specific objectives:
   a. Encourage prior preparation for this unit by the assignment of appropriate topics from the reference textbook for this unit.
   b. Since this objective section deals with those bacteria of particular interest to the epidemiologist it will be necessary for you to emphasize them utilizing examples from your geographic area (if possible). In other words, illustrate for the student those microbes which are of concern on a regional basis as opposed to those which have national or international significance.
   c. Insure thorough coverage of the objectives during class activities. Be sure to include participation from individuals in the class as their experiences may provide excellent examples of disease profiles. A great many of the students may have completed training in microbiology which will be of use during class discussion.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Student Assignment:

1. Read appropriate topic assignments from reference text for this unit: Nester, E.P., et al. Microbiology. New York: Holt, Rinehart and Winston. Second edition. 1978. This reference textbook is only a recommedation. Any text of recent publication dealing with bacteriology or microbiology will probably be suitable.

2. This unit places emphasis upon those microbes of particular significance to man. Some have drawn epidemiological interest on a local/regional basis in the U.S. and others have more international significance. Concentrate on differentrating the regional aspects of the microbes and cite examples where applicable.

3. Your instructor will cover the objectives in class. Observations and experiences in your past will contribute to the class discussion.

UNIT XIV

VIRUSES

General Objective

Following completion of this unit, the student should demonstrate a knowledge of the common viral organisms of humans. Measurement of the degree of mastery will be determined by the ability of the student to satisfactorily complete the general objectives and score a minimum of 75 percent on the unit examination.

Specific Objectives

The student will be able to:

1. Define:
   A. virion
   B. capsid
   C. core
   D. viroid

2. Describe the typical stages that occur during viral replication.

3. Describe what is meant by viral specificity.

4. Discuss the obligate nature of viral parasitism.

5. Identify the role of interferon in the immunity mechanism of the host.

6. Cite the area of activity of the following viruses:
   A. neurotropic
   B. respiratory
   C. enteric
   D. viscerotropic

7. Describe the follwoing mammalian viral diseases:
   A. polio
   B. foot and mouth disease
   C. common cold
   D. encephalomyelitis
   E. encephalitis
   F. yellow fever
   G. influenza
   H. distemper
   I. Parvo

7. Describe the following mammalian viral diseases: (con't)
   J. measles (Rubella, Rubeola)
   K. mumps
   L. rabies
   M. papilloma
   N. chickenpox
   O. variola
   P. viral tumors
   Q. fever blisters, cold sore
   R. genital herpes

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the unit and specific objectives.
   b. Insure that all students receive their assignment/information sheet.
   c. Thoroughly cover all objectives during class activities (see item #2 below).
   d. Administer unit examination upon completion of the objectives.
   e. Emphasize that the unit examination is drawn from the objectives for this unit.

2. Suggested activities for completion of specific objectives:
   a. Assign as a reading requirement selected topics from the auxiliary reference textbook: Nester, E.W., et al. Microbiology. New York: Holt, Rinehart and Winston. Second edition. 1978.
   b. Emphasize to the students that they concentrate in those textbook areas which pertain to the specific objectives.
   c. Encourage student preparation prior to class discussion by having them complete as many objectives as possible.
   d. Remember that these objectives represent a basic introduction to virology. The students will need an explanation of all objectives (with examples, as appropriate).

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Unit XIV

Student Assignment:

1. Selectively read unit textbook using the specific objectives as your guide. Unit reference: Nester, E.W., et al. Microbiology. New York: Holt, Rinehart and Winston. Second edition. 1978.

2. You may wish to use other sources to obtain this material. Any current edition of microbiology, virology will be satisfactory.

3. Try to complete as many objectives as possible prior to class as this will enhance your ability to learn and retain the objective material.

4. The unit objectives relate to basic, introductory virology with emphasis on those viruses of epidemiological significance. Include yourself in the class discussions, ask questions, and maintain a good set of notes.

UNIT XV

FUNGI

General Objective

Upon completion of this unit the student should be familiar with the stated objectives concerning mycology and score a minimum of 75 percent on the examination.

Specific Objectives

The student will be able to:

1. Describe the morphology of a typical fungus.

2. Identify the mode(s) of mold reproduction.

3. Cite the effects of the following on mold growth and development:
   A. moisture
   B. pH
   C. temperature
   D. oxygen

4. Relate how the factors in no. 3 affect mold growth and development in (around) the home.

5. A. Describe an antibiotic.
   B. Cite why antibiotics have limited effectiveness on mycotic infections.

6. Describe the following mycotic genera:
   A. Penicillium
   B. Trichophyton
   C. Microsporum
   D. Epidermophyton
   E. Histoplasmosis

7. Discribe the etiology, pathology, of ringworm infections.

8. State the degree of prevalence of fungi in the atmosphere.

Unit XV

INSTRUCTOR & STUDENT INFORMATION

Recommedations for the Instructor:

1. Activities
   a. Insure all students receive the unit and specific objectives.
   b. Provide each student with the assignment/information sheet.
   c. Cover all objectives in class. (see item #2 below).
   d. Administer the unit examination at the completion of class activities and objectives of this unit.
   e. The sample examination, if used, is drawn from the specific objectives. All unit examinations should include only that information required by the objectives.

2. Suggested activities for completion of specific objectives:
   a. Assign as required reading those sections of the auxiliary textbook dealing with fungi. Text: Nester, E.W., Microbiology. New York: Holt, Rinehart and Winston. Second edition, 1978.
   b. Urge the students to complete as many objectives as they can before class. If they do it will improve your presentation and conduct of class activities.
   c. Insure thorough coverage of the objectives as the subject matter of fungi is usually little known or understood by most students.
   d. The objectives are designed to provide the student with a fundamental understanding of the fungi. Use approriate examples to illustrate the interest of epidemiologist in these unique organisms.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet.
   c. Visual aids (as appropriate)
   d. Unit examination
   e. Unit examination answers

Student Assignment:

1. Read the appropriate section on fungi in your auxiliary textbook (Nester, E.W., et al. Microbiology. New York: Holt, Rinehart and Winston. Second edition. 1978).

2. Concentrate on those areas which deal with the specific objectives. Complete as many as you can prior to class.

3. The fungi are a group of organisms that are often neglected or misunderstood by many students. Prepare for class discussion in advance, ask questions and be sure to ask the instructor for assistance if you encounter any problems.

4. Review the objective thoroughly before taking the unit examination because it is drawn from the objectives material.

UNIT XVI

PROTOZOA

General Objective

Upon completion of this unit of study, the student should be able to identify the common human protozoans with particular emphasis on the pathogenic species. Performance measures include completion of the specific objectives and a unit examination (minimum score 75).

Specific Objectives

The student will be able to:

1. Define the protozoa.
2. Cite 2 characteristics of the Phylum Protozoa.
3. Describe a typical mastigophoran (Euglena viridis).
4. Describe a typical trypanosome and identify the following typanosome genera:
   A. trypanosoma gambiense
   B. T. rhodesiense
   C. T. cruzi
5. Describe a typical leishmanial organism as well as the following genera:
   A. Leishmania tropica
   B. L. donovani
6. Describe the following flagellate genera:
   A. Chilomastix mesnili
   B. Giardia lamblia
   C. Trichomonas vaginalis
7. Discuss the morphology of a typical ameba (Amoeba proteus).
8. Relate the importance of the following amebic genera to humans:
   A. Entamoeba histolytics
   B. E. coli
   C. E. gingivalis
   D. E. nana
   E. Naegleria fowleri
9. Describe the coccidian parasite, Toxoplasma gondi.

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10. Identify the source of the word malaria.

11. Discuss the significance of malaria to mankind today.

12. Identify the definitive and intermediate hosts of malaria.

13. Describe the four (4) species of Plasmodium that infect humans.

14. Describe a typical life cycle of P. vivax.

15. Discuss the morphology of a typical ciliate protozoan (Paramecium caudatum).

16. Describe the ciliate Balantidium coli.

17. State the scientific name of the causative agent for "ick."

Unit XVI

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the unit and specific objectives.
   b. Provide each student with assignment/information sheet.
   c. Cover all objective thoroughly in class. (see item #2 below).
   d. Administer unit examination upon completion of the unit objectives.
   e. Emphasize that the examination is drawn from and includes material required by the unit objectives.

2. Suggested activities for completion of specific objectives:
   a. Assign as required reading those areas of the following references dealing with protozoa:
      (1) Nester, E.W., et al. Microbiology. New York Holt, Rinehart and Winston. Second edition. 1978.
      (2) Schmidt, G.D. and L.S. Roberts. Foundations of Parasitology. St. Louis: C.V. Mosby Company. 1977.
   b. Instruct the students to scan the textbook material and concentrate on that material pertinent to the objectives.
   c. The protozoa represent a widely diversified group of microbes of particular concern to the epidemiologist mainly because of their cosmopolitan nature and the pathogenic characteristics of some members. Insure adequate discussion of the objectives to include descriptions of typical protozoa group representatives and parasitic members.
   d. In your class presentation you may wish to use graphic illustrations to emphasize group characteristics such as falgella, cilia, pseudopodia, etc. Living cultures may be also be used for demonstration purposes.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids
      (1) use overhead projector to illustrate protozoa species
      (2) use living specimens to demonstrate size, motility, etc.
   d. Unit examination
   e. Unit examination answers

Student Assignment:

1. Read the sections on protozoa from the following unit references:
   A. Nester, E.W., et al. Microbiology. New York: Holt, Rinehart and Winston. Second edition. 1978.
   B. Schmidt, G.D. and L.S. Roberts. Foundations of Parasitology. St. Louis: C.V. Mosby Company. 1977.

2. Concentrate on the textbook areas which relate to the specific objectives. Complete as many objectives as you can prior to class.

3. Members of the Phylum Protozoa represent a widely diversified cosmopolitan group. Some members of the phylum are free-living and other are parasitic. Insure that you understand characteristics of the major groups of protozoa such as cilia, flagella, pseudopodia. Familiarize yourself with the major parasitic species of man.

UNIT XVII

HELMINTHS

General Objective

Following completion of this unit, the student should be able to describe the etiology of the stated helminths, complete the listed objectives, and demonstrate at least seventy-five (75) percent proficiency on a unit examination.

Specific Objectives

The student will be able to:

1. Define the term helminth.
2. Identify the groups of organisms commonly referred to as helminths.
3. Cite three (3) major classes of flatworms.
4. Contrast monogenean to digenean trematodes.
5. Name the only known mammalian monogenean.
6. Summarize a typical life cycle of a digenean.
7. Contrast monostome, distome, and asphistome digeneans.
8. Describe two (2) methods of nutrient acquisition in digeneans.
9. A. Describe a typical digenean life cycle.
   B. Discuss the morphology of a typical digenean.
10. Explain what is meant by alternation of generations in a typical trematode life cycle.
11. Describe the risk involved in the human consumption of under-cooked frog legs.
12. Describe the three (3) species of medically important schistosomes, their pathology and treatment.
13. Cite three (3) techniques of schistosome diagnosis.
14. Describe what is meant by "swimmers itch."

15. Describe the biology, pathogenicity of the following trematodes:
    A. Echinostoma revolutum
    B. E. ilocanum
    C. Fasciola hepatica
    D. F. gigantica
    E. Fascioloides magna
    F. Fascoiloides buski
    G. Gastrodiscoides hominis
    H. Dicrocoelium dendriticum
    I. Paragonimus westermani
    J. Clonorchis sinensis

16. As related to cestodes, define the following:
    A. scolex
    B. rostellum
    C. suckers
    D. strobila
    E. proglottid (immature, mature, gravid)

17. Discuss the monoeious nature of tapeworms.

18. Contrast pseudophyllidean to cyclophyllidean tapeworm life cycles.

19. Describe the morphology of a typical cyclophyllidean tapeworm.

20. Discuss the method of nutrient acquisition of cestodes.

21. Describe the biology, pathology of the following human tapeworms:
    A. Diphyllobothrium latum
    B. Taeniarhynchus saginatus
    C. Taenia solium
    D. T. multiceps
    E. Echinococcus granulosis
    F. E. multilocularis
    G. Hymenolepis nana
    H. H. deminuta
    I. Raillietina spp
    J. Dipylidium caninum

22. Discuss the two (2) major lines of nematode study.

23. Describe the morphology of a typical nematode.

24. Contrast direct and indirect life cycles of nematodes.

25. Describe the biology, pathology of the following mematodes:
    A. Trichuris trichiura
    B. Capillaria hepatics
    C. Trichinella spiralis

D. *Stronglyloides stercoralis*
E. *Necator americanus*
F. *Ancylostoma duodenale*
G. *A. braziliense*
H. *A. caninum*
I. *Ascaris lumbricoides*
J. *Enterobius vermicularis*
K. *Dracunculus medinensis*
L. *Wuchereria bancrofti*
M. *Oncocerca volvulus*
N. *Loa loa*
O. *Dirofilaria immitis*

26. Contrast cutaneous to visceral larval migrans.

27. Identify the Phylum of animals to which the leeches belong.

28. Contrast predatory to blood-sucking leeches.

29. Distinguish between ectoparasites and endoparasites.

30. Discuss the historical aspects of the blood-sucking leeches in medicine.

31. Identify:
A. *Macrobdella* spp
B. *Hirudo* spp

INSTRUCTOR & STUDENT INFORMATION

Recommendations for the Instructor:

1. Activities
   a. Provide each student with the unit and specific objectives.
   b. Insure that all students receive the assignment/information sheet.
   c. Cover all objectives in class. (see item #2 below).
   d. Administer the unit examination after completion of class activities and the objectives of this unit.
   e. The unit examination has been drawn from the specific objectives.

2. Suggested activities for completion of specific objectives:
   a. Assign as a reading requirement selected areas from the following textbook of parasitology: Schmidt, G.D. and L.S. Roberts. Foundations of Parasitology. St. Louis: C.V. Mosby Company. 1977.
   b. Although this text is recommended any recent parasitology text will be suitable.
   c. Instruct the students to scan the text in the helminth sections, pausing in those areas pertinent to the specific objectives.
   d. Encourage the students to complete as many objectives as they can prior to your class discussion.
   e. Emphasize throughout the objectives the significance of helminth infection on human populations throughout the world. The impact of helminthiasis worldwide is considerable not only from the health aspect but socio-economically. Illustrate examples of this impact phenomenon from international, national (U.S.) and regional cases.
   f. You may wish to use the overhead projector and microslides to familiarize the students with the general appearance, morphology and size of the helminths.

3. Instructional materials:
   a. Unit and specific objectives
   b. Student assignment/information sheet
   c. Visual aids
      (1) Vu-Graph plates of typical helminths
      (2) Micro-slides of selected helminths
   d. Unit examination
   e. Unit examination answers

Unit XVII

Student Assignment:

1. Obtain the reference textbook on parasitology. Recommended text: Schmidt, G.D. and L.S. Roberts. Foundations of Parasitology. St. Louis: C.V. Mosby Company. 1977. This text is strictly a recommendation. Any recent edition of a parasitology text should be suitable.

2. Scan the sections of the text related to helminths. Concentrate on those areas pertinent to the specific objectives.

3. Complete as many objectives as you can prior to class. Insure that you have all objectives answered and mastered prior to the unit examination.

4. Emphasis will be placed in class on the impact of helminth infections of humans on an international, nations (U.S.) and regional basis. You will find that this impact is considerable in both health terms and socio-economic significance. Pay particular attention to the types of helminths discussed, their biology and infective capabilities.

SUPPLMENTARY MATERIALS

METHODS AND MATERIALS FOR STUDENT EVALUATION

The evaluation materials compiled here were based on the specifc unit objectives and on the use of the text:

Fox, J.P., et al. Epidemiology: Man and Disease. New York: MacMillian Pblishing Co., Inc. 1970.

Although this text is old, it covers the material at the level and in the manner appropriate for the health promotion student. If a better text is identified, many of the evaluation questions, based as they are on the specific objectives, will still be relevant.

In general, the tests are low to middle cognitive level, with short answer and fill in the blanks predominating, with some short answer questions of a more comprehensive nature. Nonetheless, it is obvious from the tests that the students are not seen as biology majors and that general and basic, rather than subtle concepts prevail.

Since there are seventeen units and therfore seventeen tests for a 14-15 week semester course, it is expected that some composit testing will occur; it would be at the discretion of the instructor whether testing is done at short or long intervals.

Unit I

EXAMINATION

Multiple Choice: Circle the single best response:

1. Which best summarizes the most important concern of epidemiology:
   A. to insure that all individuals are treated for a particular disease.
   B. to furnish urban and rural areas the necessary physicians in order to control diseases.
   C. to discover new areas of potential disease problems on a worldwide basis.
   D. to identify causative factors in disease occurrence.
   E. to provide the necessary medical supplies to protect human populations from serious diseases.

2. An organism that has the ability to cause disease:
   A. pathogen
   B. all bacteria
   C. most algae
   D. placebo
   E. none of the above

3. Which best describes the distributional pattern of human populations:
   A. community health records
   B. voter registration records
   C. demographic data from census records
   D. communicable disease data
   E. records obtained from the National Institute of Health

4. Vital statistics information is best obtained from:
   A. census records
   B. local physicians
   C. Communicable Disease Center in Altanta, GA
   D. metropolitan hospitals
   E. voter registration rolls

5. Diseases which maintain themselves at low incidence rates in a population are said to be:
   A. epidemic
   B. virulent
   C. pathogenic
   D. avirulent
   E. endemic

6. The first true epidemiologist:
   A. Fracastorius
   B. Pasteur
   C. Socrates
   D. Lister
   E. Hippocrates

7. Individual who developed the postulates used in the determination of the casual organism in a disease:
   A. Pasteur
   B. Koch
   C. Galen
   D. Graunt
   E. Webster

8. Developed the vaccination procedure:
   A. Fleming
   B. Pasteur
   C. Jenner
   D. Koch
   E. Snow

9. Case-history studies of a disease are said to be:
   A. extremely inconclusive
   B. prospective
   C. marginally reliable
   D. retropsective
   E. none of the above

10. The first step taken by a epidemiologist in the study of any disease:
   A. identify the causative organism
   B. determine occurrence in a population
   C. insure adequate medical treatment is received
   D. quarantine area of disease
   E. immediately notify local physicians of an epidemic

Fill in the blanks:

11. The cause of a particular disease is said to be the _____ of the disease.

12. _____ utilized carbolic acid during surgery to reduce suspected contamination.

13. The mechanism by which an infectious agent is transferred from an infected to a susceptible host is termed the _____.

14. In the seventeenth century _____ recorded the Bills of Mortality which were some of the earliest epidemiological records.

15. The period of _____ is the time during which an infected person can transmit his disease.

16. The steps involved in an epidemiologic investigation is similar to the _____ method.

17. The _____ period is the interval between exposure to a disease and the onset of symptoms.

18. A _____ is a healthy person capable of transmitting a disease agent.

19. A _____ is an organism that lives at the expense of another organism.

20. _____ pioneered rabies research at the turn of the twentieth century.

ANSWERS

1. D
2. A
3. C
4. A
5. E
6. E
7. B
8. C
9. D
10. B
11. etiology
12. Lister
13. vector
14. Graunt
15. communicability
16. scientific
17. incubation
18. carrier
19. parasite
20. Pasteur

Unit II

EXAMINATION

Fill in the blanks:

1-3. Name the three factors most important in disease causation in humans:

1. _____.

2. _____.

3. _____.

4-6. If a microbe has been identified as a causative agent, what 3 factors determine its ability to cause disease?

4. _____.

5. _____.

6. _____.

7-10. Name 4 host factors that may affect the acquisition of disease:

7. _____.

8. _____.

9. _____.

10. _____.

11-13. What 3 environmental factors are most often considered in disease causation?

11. _____.

12. _____.

13. _____.

14. The occurrence of an infectious agent within a host without overt symptoms is called a _____ infections.

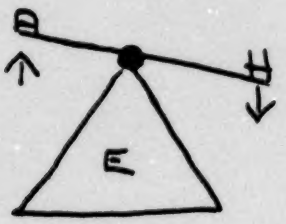
15. An agent which may produce a hypersensitivity reaction is termed a(n) _____.

16. A chemical substance which can prove harmful it taken internally is said to be a(n) _____ chemical agent.

17. Any departure from a normal state of health is termed a _____.

18-20. How would you interpret the following:

18.



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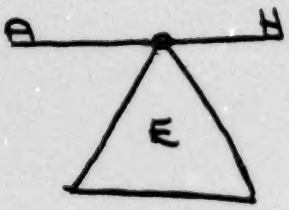

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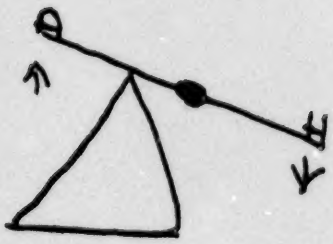


ANSWERS

1-3. Agent, Host, Environment

4-6. Ability to survive in the free state; capability and requirements to multiply outside the human host; the capacity to cause disease (pathogenicity).

7-10. Age, Sex, Race, Specific Immunity. Also susceptibility, resistance, behavior, etc.

11-13. Physical, biological, socio-economic

14. latent

15. allergen

16. exogenous

17. disease

18. The proportion of susceptibles in the human population is increased.

19. Equilibirium (health prevails)

20. Environmental change alters host susceptibility; increases disease.

Unit III

EXAMINATION

Fill in the blanks:

1. Another term often used instead of pathogenicity is _____.

2. An infection that reappears following a substantial absence of symptoms is termed a _____ infection.

3-4. Cite the 2 most obvious intrinsic properties of microorganisms:

3. _____.

4. _____.

5. A parasitic invasion on the outside of a host's body is called a(n) _____.

6-8. List 3 factors that determine the long-range survival of a parasite:

6. _____.

7. _____.

8. _____.

9. A host in which asexual reproduction of the parasite occurs is termed the _____ host.

Descriptions/Definitions:

10. Describe what is meant by a microbial reservoir.

11. Cite the major factors which may determine the pathogenicity of a microbe.

12. Define epizootic:

13. Define exotoxin:

14. Define formite:

15. Describe secondary attack rate:

16. Describe case fatality rate:

17. Give an example of the statement: the longer the association between the host and parasite the more benign the disease.

18. Define antibody:

19. Define antigen:

20. Schematically diagram the stages of microbial infection in a suitable host.

ANSWERS

1. Virulence

2. Recrudescent

3-4. Chemical composition, morphology

5. Infestation

6-8. Growth requirements, ability and survive in the free state, host range

9. Intermediate

10. All those factors, environment and otherwise, which are responsible for the survival of a microbial species.

11. Rapidity and extent to which the parasite multiplies within the host; extent of tissue damage by the parasite; whether or not a toxin is produced.

12. Disease of lower vertebrates.

13. Highly toxic secretions of parasites, especially bacteria

14. Any inanimate object which may be capable of transmitting a disease organism.

15. Frequency with which infection occurs in a person within a reasonable incubation period following known exposure to an infectious patient.

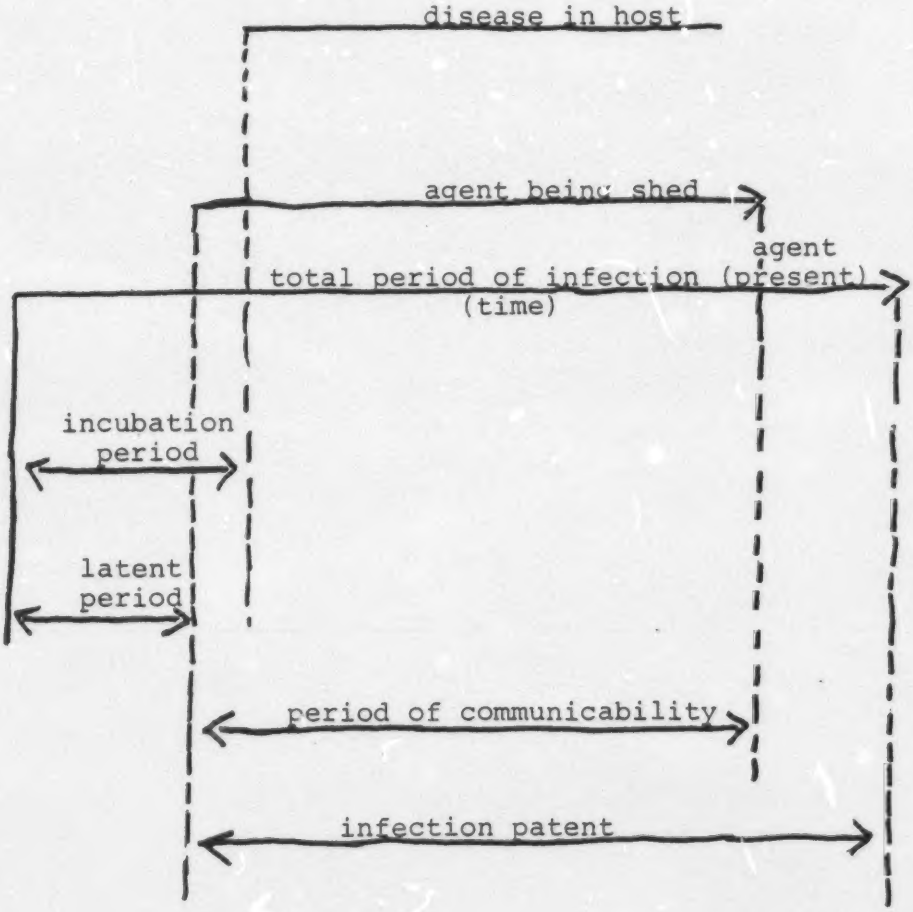
16. The number of deaths which occur compared to the total number of cases of a disease.

17. Through the passage of geologic time, the host and parasite have mutually reached a point of so-called tolerance where extensive host response to infection is limited. A prime example is the occurrence of the beef tapeworm in the human's small intestine. This benign condition may very according to number of parasites and the individual's physiology.

18. A globulin, found in tissue fluids and blood serum, produced in response to a specific antigen and capable of combining with that antigen.

19. Any substance capable of inducing an antibody response.

20.



Unit IV

EXAMINATION

Multiple Choice: Circle the best response.

1. Which of the following is an effective antiviral substance:
   A. antigen
   B. interferon
   C. extoxins
   D. endotoxins
   E. hyaluronidase

2. Which is (are) phagocytic cells of humans:
   A. neutrophils
   B. barophils
   C. eosinophils
   D. monocytes
   E. all of the above

3. Some evidence indicates that tuberculosis is higher in:
   A. Caucasians (in U.S.)
   B. Black Americans

4. Past the age of twenty, paralytic poliomyelitis is more common among:
   A. women
   B. men

5. Which best describes the chemical composition of antibodies:
   A. lipids
   B. carbohydrates
   C. nucleic acids
   D. protein
   E. both c and d

6. In the acquisition of antibodies through medical innoculation is characterized by:
   A. long term protection
   B. short term protection
   C. the onset of serum sickness in most cases
   D. the onset of anaphylaxis in most cases
   E. a procedure not used in modern medical practice

7. Immunity induced through a natural infection is characterized by:
   A. long-lasting effects
   B. short-term effects
   C. has no effect in humans
   D. is most effective in the great apes
   E. both c and d

8. Can be used to induce active immunity in a person:
   A. ingestion of antibodies
   B. innoculation of gamma globulin
   C. inducement of local inflammation
   D. vaccine
   E. colostrum

9. Clostridium tetani can produce the disease, tetanus. This preparation can neutralize the effect of the organism in humans:
   A. toxoid
   B. antigens
   C. endotoxin
   D. exotoxin
   E. gamma globulin

10. Allergic reaction characterized by spasms of smooth muscles of blood vessels or bronchistes:
   A. hypertension
   B. ringworm
   C. anaphylaxis
   D. food poisoning
   E. none of the above

Fill in the blanks:

11-12. Name the 2 principle immunologic responses in humans:

11. _____.

12. _____.

13. The type of immunity possessed by a large group of organisms is termed _____.

14. Transplacental migration of antibodies from the mother to the fetus is an example of _____ immunity.

15. The engulfment of foreign matter by cells in the body is called _____.

16. The state of temporary resistance to infections with other viruses induced by an existing virus infection is called _____.

17. _____ are white blood cells of known antibody activity.

18. Failure of the body to recognize its own antigens is termed an _____ disease.

19. The occurrence of one disease which "paves the way" for another disease is called a(n) _____ disease.

20. Because of the nature of exposure and the immune response, poliomyelitis and measles are most common in _____ (young, old) persons.

ANSWERS

1. B
2. E
3. B
4. A
5. D
6. B
7. A
8. D
9. A
10. C
11-12. Production of antibodies; hypersensitivity
13. Hear
14. Naturally acquired passive
15. Phagocytosis
16. Interference
17. Lymphocytes
18. Auto-immune
19. Intercurrent
20. Young

Unit V

EXAMINATION

Select any 4 of the 5 objectives for completion:

1. Identify the 3 broad areas of concern when dealing with environmental factors and their relation to disease.

2. Cite reasons to illustrate the difficulty in evaluating environmental factors in disease causation.

3. The following are factors of the physical environment that may influence disease causation. Describe each of them.
   A. geography and geographic epidemiology
   B. geologic factors
   C. climate

4. Describe the role of the biologic environment in disease causation. Include in your description the following:
   A. nutritive components
   B. agriculture
   C. plant allergens and toxins
   D. microbes/parasites
   E. manipulation of biologic environment
   F. biocides

5. Describe how each of the following socioeconomic factors relate to disease causation.
   A. population distribution
   B. social and political structure
   C. state of economic development

Unit V

ANSWERS

Since the unit examination is of a discussional/descriptive type, reference pages are inserted rather than specific answers.

1. Page 93
2. Page 93
3. Pages 94-96
4. Pages 99-101
5. Pages 102-107

Unit VI

EXAMINATION

Fill in the blanks:

1-3. Cite the 3 principal roles of the epidemiologist:

1. _____.

2. _____.

3. _____.

4-7. State law requires registering of 4 vital events. Name them:

4. _____.

5. _____.

6. _____.

7. _____.

8. $\frac{\text{number of live births during year}}{\text{population at midyear}} \times 1{,}000 =$ _____.

9. $\frac{\text{number of children under 5}}{\text{number of women, age 15-49}} \times 1{,}000 =$ _____.

10. $\frac{\text{death due to a disease}}{\text{total population as of 1 July}} \times 100{,}000 =$ _____.

11. Proportional Mortality Rate (PMR) = _____.

12. Per MR = _____.

13. $\frac{\text{no. of known cases of a disease}}{\text{population}} \times 1{,}000 =$ _____.

14. $\frac{\text{no. of new cases of a disease}}{\text{population at midperiod}} \times 1{,}000 =$ _____.

Complete the following:

15. (Give an interpretive example of an age-specific death rate; use examples from text. Ask a specific question concerning data).

16. (Analyze a graph of infant and neonated mortality rates; use example from text. Ask a specific question concerning data).

17. Of what value is the secondary attack rate to epidemiologists (define also)?

18. How can census information be of use to the epidemiologist?

19-20. (Give an example of a survivorship and life expectancy curve from textbook examples. Ask a pertinent question concerning each).

ANSWERS

1-3. Director of experimental studies; collation of observational data; maintenance of, or analysis of vital events records.

4-7. Birth, death, marriage, divorce

8. Birth rate

9. Fertility ratio

10. Cause specific death rate

11. $\frac{\text{Deaths due to a disease}}{\text{Total deaths in year}} \times 100$

12. $\frac{\text{no. of deaths of infants under 7 wks. but greater than 28 wks.}}{\text{no. of live births + fetal deaths in claendar year}} \times 1{,}000$

13. Prevalence rate

14. Incidence rate

15. (reference text for example)

16. (reference text for example)

17. SAR is a measure of the occurrence of a contagious disease among known susceptible persons following exposure to an infectious agent. It is used to measure the spread of infection following contact.

18. Used to measure the frequency of vital events as rates.

19-20. (reference text for example)

Unit VII

EXAMINATION

Fill in the blanks:

1-5. Cite the 5 most common errors in experimental studies;

1. _____.
2. _____.
3. _____.
4. _____.
5. _____.

6-10. Cite the 5 basic principles of sampling human populations:

6. _____.
7. _____.
8. _____.
9. _____.
10. _____.

11. With the table of random numbers provided, describe a method of random sampling.

12. What is the probability of throwing a three (3) with a die on the first toss?_____

13. With the same die, what is the probability of tossing 3 consecutive fours? _____

Complete the following:

14. Of what value is a test of significance?

15. Describe a 95 percent confidence interval.

16. Name some advantages of sequential testing.

17. Define a Type 1 error.

18. Define a Type 2 error.

19. What is the major need for random sampling devices?

20. What is the probability of tossing a single zero if the die is thrown three times? _____.

ANSWERS

1-5. Improper selection of study groups; improper extrapolation of results; unsuspected biological association subjectivity in collection and data evaluation; errors of response or classification.

6-10. Population must be well defined, (identifiable) sampling mechanisms must be such that the probability of a person's being included is known and is not zero; the sampling plan must be carried out as designed; conclusions apply only to the sample tested; extrapolation on a different population than that sampled is not part of statistical inference.

11. [illegible]ce example in text)

12. 1/6

13. 1/216

14. It is basically a test of significance of the difference between 2 percentages or values.

15. An interval estimate for a population parameter (or for the difference in two populations) constructed by a method which has the property that the resulting interval will include the true value in 95 percent of similar sampling experiments.

16. Advantageous when observations can be made one at a time in sequence especially in the study of rare diseases, expensive tests, and studies in which human lives are at stake.

17. The conclusion that 2 populations differ in the value of some parameter when they do not.

18. An error of failing to detect a true difference, or of making a false conclusion that no difference exists.

19. Guarantees against personal bias in selection of samples.

20. 75/216 or $3(5/6)^2(1/6)$

Unit VIII

EXAMINATION

Fill in the blanks:

1. According to records, diabetes is most common in _____ (men, women).

2. Arthritis is found to be more prevalent in _____ _____ (men, women).

3. Hemophilia, color blindness, and pattern baldness have sex-linked genetic traits and are most often expressed in _____ (men, women).

4. On a worldwide basis, sickle-cell anemia is most often associated with _____ _____ (Blacks, Caucasians, Orientals).

5. Skin cancer more frequently is found in _____ (Blacks, all other light-skinned people).

6. An extra chromosome associated with pair 21 results in _____.

7. The disease, _____ results from an Rh imcompatibility between the fetus and the mother.

8. Widowed or divorced men have _____ (more, less) definite coronary heart disease than expected.

9. Persons with persistent illness are _____ (more likely, less likely) to enter marriage.

10-11. Cite the 2 principles involved in the classification of disease according to clinical manifestations.

10. _____.

11. _____.

12. What personal characteristic is most strongly related to the acquisition of disease?_____.

13-15. Patterns of disease as a function of age can best be analyzed by 3 methods. Name them.

13. _____.

14. _____.

15. _____.

16. In the U.S. there are more _____ (males, females) born per unit time.

17. The death rate for _____ (males, females) is consistently higher than the other sex from birth onward.

18. Past age twenty, the risk of poliomyelitis is greater for _____ (males, females).

19. Bone disease such as _____ are more common in dark-skinned people due to the increased skin pigmentation and resulting decrease in Vitamin D production.

20. In a large family, the youngest child has a _____ (greater, lesser) chance of contracting an infectious disease.

ANSWERS

1. Women
2. Women
3. Men
4. Blacks
5. Light-skinned people
6. Down's syndrome (Mongolism)
7. Erythroblastosis fetalis
8. Less
9. Less likely

10-11. Knowledge of the full extent of human contact with an agent is vital to understanding how it reaches man; the influence of important contributing factors may be reflected by the patterns of occurrence of clinically different responses to the agent.

12. Age

13.-15. Incidence, prevalence, and mortality.

16. Males
17. Males
18. Females
19. Rickets
20. Greater

Unit IX

EXAMINATION

(To the instructor: This may be a good opportunity to utilize the specific objectives as the unit examination)

Complete the following:

1. What factors are important to consider when one refers to place?

2. Name the organization which provides morbidity data worldwide.

3. To how small an area may morbidity data be made available?

4. Cite the method by which disease outbreaks may be plotted graphically.

5. The U.S. Census Bureau uses 3 residence classifications. Name them.

6. What is the historical pattern of disease in the 3 regions in number 5?

Unit IX

ANSWERS

1. Refer Page 209, Course Textbook.
2. Refer page 210, Course Textbook.
3. Refer page 227, Course Textbook.
4. Refer pages 227-230, Course Textbook.
5. Refer page 230, Course Textbook.
6. Refer pages 233-235, Course Textbook.

Unit X

EXAMINATION

Fill in the blanks:

1. What units of time are most convenient for epidemiologist? _____.

2. A disease which is maintained in a low profile within a population is said to be _____.

3. Several critical requirements must be met before _____ can be used as an index of time trends in disease occurrence.

4. Epidemiologists often use the term _____ to describe an epidemic of limited scope.

5. Under natural conditions, infectious disease are characterized by remarkably constant average _____ _____.

6. _____ are often used by epidemiologists to correlate incubation periods and disease.

7. Epidemics which usually last only a few days are called _____.

8-10. Cite 3 examples of the type of epidemic mentioned in #7 above.

8. _____.

9. _____.

10. _____.

11. Most epidemics are self-limited, however, some are self perpetuating unit the cause is removed or controlled. Outbreaks of the latter type are called _____.

12-13. Two (2) examples of epidemics as indicated in #11 are:

12. _____.

13. _____.

14-16. Name the 3 most important factors associated with the effects of seasonal variations or disease causation:

14. _____.

15. _____.

16. _____.

17. Mortality in the U.S. is highest during the _____ months.

18. An _____ year is demarcated by the week of lowest incidence.

19-20. Describe a cohort and the significance of cohort analysis to the epidemiologist.

ANSWERS

1. Any unit of time is appropriate and will depend on the disease and data analysis.

2. Endemic

3. Mortality

4. Outbreak

5. Incubation periods

6. Time clusters

7. Point epidemics

8-10. Bacterial contamination of water; acute air pollution; ingestion of chemically or microbially contaminated food.

11. Continuing source

12-13. Salmonellosis outbreak in 1965 in Calif.; myocardial disease outbreak in 1966 in Nebr.

14-16. Mean temperature; amount or type of precipitation; length of day (photoperiod)

17. Winter (Dec. and Jan.)

18. Epidemiologic

19-20. Refer page 261 in course textbook

Unit XI

EXAMINATION

Fill in the blanks:

1-2. Name 2 general categories of epidemiological research based on methodology:

1. _____.

2. _____.

3-4. Cite 2 categories of epidemiological research based on location:

3. _____.

4. _____.

5-7. Name 3 objectives of a lab based on epidemiological research effort:

5. _____.

6. _____.

7. _____.

8-9. What 2 groups of organisms are always used in experimental epidemiological research methods?

8. _____.

9. _____.

10-11. Describe each group listed in previous question (8-9):

10. _____.

11. _____.

12. What major problem is often encountered in classical research epidemiology?

13. What kind of experimental studies involve human subjects most often?

14-16. Name 3 conditions under which human populations are used in experimental research:

14. _____.

15. _____.

16. _____.

17. Under what major conditions are epidemiological surveys conducted?

18. Examination of the blood serum of humans has proven an effective monitor of a number of diseases. This type of survey is called a _____.

19. The monitoring of a disease on a continual basis is an example of a _____.

20. Another name for the prospective type of epidemiological study is the _____ approach.

ANSWERS

1-2. Experimental; observational

3-4. Laboratory; field

5-7. Classification (of agent); study the natural history of disease; develop methods of prevention or control of the disease.

8-9. Experimental and control groups

10-11. Experimental group - group upon which the factors being tested are measured.
Control group - group treated exactly like the experimental group except in the factor being tested.

12. Interpretation of results

13. The testing and evaluation of vaccines

14-16. When the subjects are volunteers; when humans are the only known hosts; when the anticipated results outweigh the risks; also, when studies with animals have been exhausted.

17. When existing information about causitive factors in human disease is inadequate.

18. Sero-survey

19. Surveillance

20. Cohort

Unit XII

EXAMINATION

Fill in the blanks:

1. The field of _____ is most closely allied with epidemiology.

2. Most epidemiologists are _____ by profession.

3. Most epidemiologists are employed by _____.

4. As contrasted with clinical medicine which is encountered in the private practice of physicians, epidemiology is often referred to as _____ practice.

5. _____ is the primary job responsibility of the practicing epidemiologist.

Complete the following:

6-7. Describe the data flow chart as an effective mechanism for dealing with communicable disease.

8-9. Describe the importance of "contingencies of reporting" to the epidemiologist.

10. Describe the role of the epidemiologist in modern and future so cities (as compared to the past).

Unit XII

ANSWERS

1. Medicine
2. Physicians
3. Local, state, and national governments
4. Public
5. Disease surveillance

6-7. (Refer to pages 318-319 course textbook)

8-9. (Refer to pages 319-322 course textbook)

10. (Refer to page 326 course textbook)

Unit XIII

EXAMINATION

Multiple Choice: Circle the single correct response.

1. Cholera is often encountered in undeveloped countries and those struck by natural disasters. To what genus of bacteria does the causative agent belong?
   A. Clostriduim
   B. Bordatella
   C. Brucella
   D. Diplococcus
   E. Vibrio

2. Bacteria of spherical morphology:
   A. comma
   B. coccus
   C. rod
   D. bacillus
   E. spirochoete

3. Normally, bacteria are classified as:
   A. plants
   B. animals
   C. monerans
   D. fungi
   E. protista

4. A gram reaction with a violet color is said to be gram:
   A. positive
   B. negative
   C. neutral
   D. both a and b
   E. none of the above

5. A rickettsial disease confined to high mountainous regions:
   A. typhus
   B. plague
   C. pneumonia
   D. Rocky Mountain Spotted Fever
   E. none of the above

6. Pasteurization of milk was developed to prevent the transmission of this disease:
   A. pneumonia
   B. tuberculosis
   C. polio
   D. typhoid fever
   E. scarlet fever

7. Most bacteria found in milk arise from this source:
   A. contamination
   B. from the cow's udder
   C. Spontaneous generation
   D. bloodstream of the cow
   E. none of the above

8. "Parrott" fever:
   A. diphtheria
   B. typhus
   C. plague
   D. typhoid fever
   E. psitlocosis

9. Soluble proteins which are highly toxic when secreted out of the bacterial cell:
   A. antigens
   B. exotoxins
   C. antibodies
   D. endotoxins
   E. blood poisons

10. Causative agent of syphilis:
   A. Staphylococcus aureus
   B. Streptococcus sp.
   C. Brucella abortus
   D. Treponema pallidum
   E. Salmonella typhosa

11. Which of the following are considered to be coliform bacteria:
   A. Escherichia coli
   B. Plasmodium viriax
   C. Enterobactes aerogenes
   D. Salmonella sp.
   E. Both a and c

12. The "mordant" of the gram reaction:
   A. crystal violet
   B. iodine
   C. safranin
   D. 95 percent ETOH
   E. none of the above

13. Which toxic material of bacteria are part of the cell wall?
   A. endotoxin
   B. antibodies
   C. exotoxins
   D. interferon
   E. both b and c

14. Tetanus and gas gangrene are associated with this genus of bacteria:
    A. Staphylococcus
    B. Streptococcus
    C. Pasteurella
    D. Clostriduim
    E. Corynebacteruim

15. Mode of transmission of Rocky Mountain Spotted Fever:
    A. flea
    B. ant
    C. tick
    D. mosquito
    E. louse

16. An infection caused by Coxiella burnetti may cause:
    A. Q fever
    B. typhoid fever
    C. scarlet fever
    D. typhus
    E. Rocky Mountain Spotted Fever

17. A gram positive diplococcus from mucous membranes may indicate:
    A. staph infection
    B. gonorrhea
    C. strep infection
    D. Bacillus subtilis
    E. none of the above

18. Whooping cough may be due to this organism:
    A. Brucella
    B. Neisseria
    C. Vibrio
    D. Treponema
    E. Bordatella

19. Which cell produces the most antibodies:
    A. alpha cell
    B. beta cell
    C. plasma cell
    D. lymphocyte
    E. none of the above

20. Engulfment of foreign matter by a cell is termed:
    A. phagocytosis
    B. pinocytosis
    C. antigen-antibody response
    D. allglutination
    E. anaphylactic shock

Unit XIII

ANSWERS

1. E
2. B
3. C
4. A
5. E
6. B
7. A
8. E
9. B
10. D
11. E
12. B
13. A
14. D
15. C
16. A
17. B
18. E
19. C
20. A

Unit XIV

EXAMINATION

Fill in the blanks:

1. A fully infectious virus particle is termed a _____.

2. Those viruses that attack nervous tissue are said to be _____ viruses.

3. Because viruses cannot replicate outside of living cells, they are said to be examples of a(n) _____ _____ parasite.

4-5. Yellow fever virses are transmitted by _____ which have the following scientific name _____.

6. The first stage in the replication cycle of a virus is _____.

7. Cells which have had exposure to certain viruses produce an anti-viral substance called _____.

8. Any combination of approximately 75 viruses can cause symptoms of the _____.

9. _____ can be detected by the presence of Negri bodies in brain tissue.

10. Fever blisters and cold sores are caused by the _____ _____ virus.

11. _____ is a feline distemper virus which lately has manifested itself in young dogs.

12. Another name for a papilloma is a(n) _____.

13. Smallpox is otherwise known as _____.

14. The protein covering of a virus is termed the _____ _____.

15-16. Name 2 vaccines that assist in the prevention of polio:

15. _____

16. _____

17. A viral venereal disease which has reached high levels of infection in the U.S. and for which there is no known cure is _____.

18-19-20. Name the 2 types of measles and indicate which has particular significance during the first trimester of pregnancy:

18. _____.

19. _____.

20. _____.

ANSWERS

1. Virion
2. Neutrotropic
3. Obligate
4. Mosquito
5. *Aedes aegypti*
6. Absorption
7. Interferon
8. Common cold
9. Rabies
10. Herpes simplex
11. Parvo
12. Wart
13. Variola
14. Capsid

15-16. Salk, Sabin

17. Gential herpes

18-19-20. Rubella, rubeola; rubella is dangerous to the fetus during the first trimester

EXAMINATION

Fill in the blanks:

1. That portion of a mold which penetrates into the substrate: _____.

2-4. Name 3 genera of fungi that are often involved in epidermal infections:

2. _____.

3. _____.

4. _____.

5. Non-septate molds are called: _____.

6. Localized epidermal mycotic infections are often referred to as _____.

7. Most molds are _____ (aerobic, anaerobic).

8-9. Some molds produce _____ which are antibacterial in action. An example of a mold which produces these substances is _____.

10. A mycotic disease seen frequently in persons employed by the poultry industry is _____.

11. Most molds prefer a (n) _____ (acidic, basic) environment.

12. The entire mass of filaments of a mold is the ____ _____.

13. As temperature _____ (increases, decreases) mold activity or growth increases.

14. A mold filament is called a _____.

15. An effective antibiotic for fungal infections is ____ _____.

16. As moisture increases, mold growth and development _____ (increases, decreases).

17. Would you say that the concentration of mold spores in the atmosphere is high or low? _____

18. An epidermal mycotic infection is most effectively treated _____ (topically, internally).

19. Molds reproduce sexually or asexually by the production of _____.

20. In sexual reproduction, mold reproductive structures enclosed within a sac are called_____.

ANSWERS

1. Phizoid
2-4. Trichophyton, Microsporum, Epidermophyton
5. Coencytic
6. Ringworm
7. Aerobic
8. Antibiotics
9. Penicillium
10. Histoplasmosis
11. Acidic
12. Mycelium
13. Increases
14. Hypha
15. Griseofulvin
16. Increases
17. High
18. Topically
19. Spores
20. Sporangiospores

Unit XVI

EXAMINATION

Fill in the blanks:

1-2. Cite 2 characteristics of the Phylum Protozoa.
1. _____.
2. _____.

3. A mastigophpran moves by means of _____.

4. Toxoplasmosis in humans is usually transmitted from what animal?_____.

5. A deadly ameba common in the sediment of freshwaters in the South is _____.

6. Another name for "bad air" is _____.

7. _____is the disease which has produced the highest mortality in humans than any other disease.

8-9. The causative agent of African sleeping sickness is _____and is transmitted by the _____.

10. Mature trypansome are found in the _____ of humans.

11. Ameba are motile by means of _____.

12. Paramecium and related protozoa are motile by means of _____.

13. A pathogenic ameba often found as a contaminant of vegetables from Mexico , Central and South America. _____.

14. Mosquito which transmits malarial organism is _____.

15. Infective form of malarial parasite to humans is _____.

16. Intermediate host of malaria _____.

17. Benign tertian malaria is caused by _____.

18. The sexual forms of the malaria parasite are called male and female _____.

19. The flagellated "owl" faced parasite of the human intestine: _____.

20. Leishmanial parasites are found in the _____ of humans.

ANSWERS

1-2. Unicellular, eucaryotic

3. Flagella

4. Domestic cats

5. *Naegleria fowleri*

6. Malaria

7. Malaria

8-9. Trypanosome gambiense; tse tse fly

10. Blood

11. Pseudopodia

12. Cilia

13. *Entamoeba Histolytica*

14. *Anophedes*

15. Sporozoite

16. Humans

17. *Plasmodium vivax*

18. Gametocytes

19. *Giardia lamblia*

20. Blood

EXAMINATION

Fill in the blanks:

1. A _____ trematode is characterized by being an ectoparasite of vertebrates.

2. The schistosomes are found within the _____ of man.

3. Digenian trematodes usually have _____ (simple, Complex) life cycles.

4-7. Name 4 groups of organisms normally referred to as helminths:

4. _____.

5. _____.

6. _____.

7. _____.

8. _____ is the beef tapeworm.

9. The "fiery serpent" of the Middle East is _____.

10. Cutaneous and visceral larival mirgrans are caused by migration _____ larvae.

11. Dirofilaria immitis is the _____ of dogs and sometimes man.

12. An _____ is a general term used to denote the existence of a parasite within a host's body.

13. The New World hookworm: _____.

14-15. The head of a tapeworm is called the _____ and the segments are termed _____.

16. Clonorchis cininsis is the _____ fluke.

17. Adult tapeworms obtain their nourishment through the _____ of nutrients from the host's intestine.

18-19. Consuming under cooked pork, one may become infected with this tapeworm: _____; this round-worm: _____.

20. Macrobdella by common name is a _____.

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ANSWERS

1. Monogenean
2. Blood (bld vessels)
3. Complex
4-7. Trematodes (flukes); Cestodes (tapeworms); Nematodes (roundworms); leeches
8. Taeniarhynchus saginatus
9. Dracunculus medinensis (giunea worm)
10. Hookworm
11. Heartworm
12. Endoparasite
13. Necator americanus
14. Scolex
15. Proglottids
16. Chinese (human) liver
17. Absorption
18. Taenia solium
19. Trichinella spiralis
20. Leech

OTHER MATERIALS IN THIS SERIES

The U. S. Department of Education contracted with the Baptist College at Charleston to produce the following products, which are now available as part of the Rural Health Promotion Series supporting an associate degree in rural health.

1. A Final Project Report , including summary information about the design of the 2 year degree; conceptual, developmental, and applications issues; and a compilation and analysis of preliminary qualitative evaluation of the program components (by professionals in the health care field) and the programs goals (by rural residents and care providers).

2-8. A series of seven courses designed to meet the needs of this two year degree including -

Interpersonal Communications: skills in listening, sharing information, observation, and assessment,with special focus on cultural concerns, verbal and non-verbal messages.

Epidemiology: inter-relations of disease development and prevention in a public health model of host, agent, and environment; specially focused at the sophomore level.

Concepts of Chemistry: an up-dating of traditional chemistry concepts for allied health.

Health Care Organization and Issues: An overview of community health care systems with special focus on issues such as financial support, ethical dilemmas, changing services and technologies, and future directions, including

computers in intervention, treatment and education.

Health Promotion Seminar: A hands-on personal experience in behavior change around life-style issues, including up to date data and consideration of popular media ideas of health promotion.

Fundamentals of Paraprofessional Care I and Fundamentals of Paraprofessional Care II: A sequence of two courses designed to produce a person educated in major health issues and responses, with special skill development in physical care, emotional support, personal hygiene, safety and first aid (including Cardio-Pulmonary Resusitation).

Each of the instructor resource guides for teaching one of the above courses includes overview material on the total project (to provide perspective for content and methodological elements) as well as context of the course in the overall curriculum.

9. Rural Health Focus Guides for Core Content of the Health Promotion Associate Degree: This document is the work of professional educators in fields which make up the curricular core of the associate degree. The focus guides are the result of thoughtful consideration by these teachers regarding how their subject area relates to the necessary knowledge and competencies of a community paraprofessional in health promotion. All of the authors of the focus guides attended a workshop on health promotion which brought together core faculty, health educators, rural health sociologists, rural health care

providers, and rural health care recipients. The focus guides are the product of their individual approaches to the relevance of their subject matter to the overall degree; each gives ideas for highlighting particularly useful areas of a core course without in any way compromising the existing goals and expectations applied to all students who take these courses. Bound together in one volume, the focus guides cover the areas of

Freshman English,
general college mathematics,
general psychology,
human growth and development,
psychology of adulthood and aging,
introductory sociology,
social service systems,
New Testament religion,
interpersonal communications skills,
group dynamics,
anatomy and physiology,
microbiology,
introductory allied health chemistry.

The nine products listed above are in the ERIC system; copies are also housed with the contractor (the Baptist College of Charleston, Charleston, S.C.) and with the funding agency (the U. S. Department of Education, Office of Vocational and Adult Education, Washington, D.C.)